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ELEMENTS OF EDUCATIONAL RESEARCH

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FOREWORD

Our country today is facing a terrible dilemma. While our entire efforts and energies were concentrated on a peaceful, economic reconstruction of society, we have been suddenly called upon to undertake all the burdens of an unwelcome and unforeseen foreign incursion on our soil. In this context of emergency, one is apt to lose one's perspective and grow blind to ultimate goals in pursuit of the most immediate ones. In war, as in peacetime, it is incontestable that education has an important role to play. Further, it is important that education be geared to the changes and upheavals taking place in the community which it tries to serve. While attempting to do this, we have often been led astray by the glamour and glare of achievements claimed by the other countries. This has led to much circular thinking, blind imitation, incomplete assimilation and defective planning. The Social Sciences, still to attain the full-fledged stature of scientific adulthood in the West, have hardly passed the stage of infancy in our own part of the globe. Therefore, it is not surprising, that a serious and sophisticated thinker or worker in education hardly finds any relevant material or information available to him when he seeks to plan the future of our educational system. The dearth of adequate personnel to man the various research departments is only matched by the lack of vision, originality and even of elementary knowledge of research techniques displayed by quite a few who are trying to fill the void. It is an exhaustive and extensive task ; it needs long-range planning. It also needs very care that the first steps taken to prepare such personnel who are to be the mentors of educational destiny be sufficiently well-equipped and properly trained.

No doubt, many training colleges and educational departments are doing a good job of making the best out of a bad situation. Faced as we are with the numerous problems like the paucity of adequate finance, library facilities, research tools, guidance and essential equipments, what we have been able to do is creditable. The Union Governments and State Governments do realize the importance of education and research in

education in the "shape of things to come". The very urgency with which the recently set up National Council of Educational Research and Training is working offers the evidence needed. It seeks to search out, foster, encourage, guide, initiate and integrate projects in educational research in very nook and corner of the country.

Education in research is an even more immediate need of the hour than research in education. The vast majority of the M.Ed. syllabi, which have the avowed aim of turning out research minded individuals, show the paucity of relevant literature obtaining in India. Apart from the sad fact that even our post-graduate students hardly ever get into the habit of reading anything else except prescribed text-books, the sadder fact remains that those few who wish to do so, do not find guidance as to where and how to start looking for original research works or references.

The present book is a very promising beginning in such a good cause. Its main aim is to provide a handy text-book as well as reference book to the Indian student of education. It is valuable even to foreign, more sophisticated research workers, inasmuch as it provides data on Indian education and research, not available elsewhere. The authors are well-qualified and experienced, as is shown by the blurb. Two of them are working in the National Council of Educational Research and Training and are attached to Departments directly concerned with guiding, promoting and undertaking research work in education.

This certainly does not provide the last word in the field. The authors themselves would disclaim hastily any such thesis. But it is the first venture of its kind and also gives the latest available information. More such books written from different approaches, for different levels, are very necessary for any progress in mature research. Meanwhile, there can be no two opinions that this fulfills a very real need felt by the majority of students of educational research in India.

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CHAPTER ONE

Research in Education : Significance, Need and Characteristics

Research and progress. Significance of and need for research in education. Educational research and scientific research—their common characteristics. Special characteristics of educational research. Summing up.

Research has proved to be an essential and powerful tool in leading man towards progress. There would have been very little progress, as we find it today, without systematic research.

> The secret of our cultural development has been research, pushing back the areas of ignorance by discovering new truths, which, in turn, lead to better ways of doing things and better products.[1]

All significant research leads to progress in some field of life or the other. Each year new products, new facts, new concepts and new ways of doing things come into our lives due to ever-increasing significant research in the physical, the biological, as well as the social and the psychological fields. Research activity is no longer confined to the science laboratory. Even as the manufacturers, the agricultural experts and the archeologists carry on research in their respective spheres, so also the sociologists, anthropologists, economists and the educationists.

The goal of all research is progress and good life. In so far as good education is recognized as the basis of adequate individual and social development, need for research in education to improve educational practices and policies is being realized increasingly. The educationists are constantly searching for more effective methods of instruction, more satisfactory techniques of evaluation, richer learning materials, more comfortable physical facilities, more efficient systems of administrative organization, and so on. This search is assuming greater

[1] John W. Best, *Research in Education*. U.S.A. : Prentice Hall Inc., Englewood Cliffs, 1959, p. 9

urgency because of the very rapid expansion and democratization of education throughout the world during the last few decades. Since the right of every individual to full development through education has been recognized everywhere, every country is aiming at providing universal education to its people in the shortest possible time. As a result a number of new educational problems, never imagined hitherto, have arisen, and many old problems in various educational fields have become more complicated and acute. For a successful solution of the multitude of old and new problems, and for a full realization of the educational aims set up during the present times, it is realized that research work, adequate both in quantity and quality, should be carried out by properly trained research workers. The abstract quoted below brings home very effectively this very fact.

> Article 26(1) of the Universal Declaration of Human Rights states : *Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.*
>
> To realize this goal, the nations of the world will have greatly to expand their educational efforts : more facilities must be provided ; more teachers must be trained ; new curricula must be developed ; and new teaching materials must be provided. It is inconceivable that this can be done efficiently, or indeed that it can be ever done at all, without detailed guidance from the facts collected and the principles established through educational research.[2]

No amount of learning by trial and error, no amount of experience gathered through actual practices and no amount of wisdom collected in the from of casual observations can ever promise such rapid progress in education as is required all over the world today. Systematic research in education would surely save time, money, energy and a lot of failure and frustration, and show us the path of progress.

Thus, it is not difficult to show that research in education is extremely necessary and very worthwhile. But to the question—

[2] *Report of the First International Conference on Educational Research.* Educational Studies and Documents, No. XX. Paris : UNESCO, 1956, p. 16.

'*What is educational research and what are its characteristics* ?' there may not be one agreed answer. It might be helpful to acquaint ourselves with some of the accepted connotations of the term *educational research.*

> Research is considered to be the more formal, systematic, intensive process of carrying on the scientific method of analysis. It involves a more systematic structure of investigation, usually resulting in some sort of formal record of procedures and a report of results or conclusions.[3]

> Educational research is that activity which is directed towards development of a science of behaviour in educational situations. The ultimate aim of such a science is to provide knowledge that will permit the educator to achieve his goals by the most effective methods.[4]

> At least one general definition of research would be that which refers to the *activity* of collecting information in an orderly and systematic fashion. Research is literally [speaking a kind of human behaviour, an *activity* in which people engage. In education, teachers, administrators, scholars, or others engage in educational research when they systematically assemble information about schools, school children, the social matrix in which a school system is determined, the characteristics of the learner or the interaction between the school and the pupils.[5]

Definitions and interpretations of educational research, however, variously worded like the above, do all agree in their implication that educational research involves an application of the main principles of scientific research to the solution of educational problems. As such, much of what is considered educational research would be classified as '*development, demonstration or operations research*' since it 'works day in and day out to help the teacher or principals or agencies in authority over school systems'.[6] Education, like Medicine,

[3] J.W. Best, *op. cit.*, p.6.

[4] Robert M. W. Travers, *An Introduction to Educational Research.* New York : Macmillan and Co. Ltd., 1958, p. 5.

[5] Francis G. Cornell, *Report of the first International Conference on Educational Research, op. cit.*, p. 29.

[6] *Loc. cit.*

Cf. "Better education means better development and formulation of instructional aims, better motivation of pupils, better teaching methods, better evalution and better supervision and adminstration. These are all *activities* or *operations.*"—Stephen M. Corey, "Some thoughts about educational research", *Education and Psychology Review,* Vol. I., No. 1, 1961.

is an applied science. So research in Education, like research in Medicine, is mostly *applied research.*

> The primary function of research in education as in medicine—is to find improvements for education or medicine both to be understood as fields of human actions, not as fields of knowledge.[7]

But, educational research may be *basic* too. It is *basic* or *fundamental* when it is not concerned so much with day to day matters and specific phenomena and problems as with the solution of fundamental problems, and when it results in broad generalizations or principles and theories of education. Discovery of such useful concepts as those of motivation, reinforcement, concept formation and social environment in learning are a result of fundamental educational research.

Whether educational research be of the basic or the applied type, it shares some of the main characteritics of scientific research. They may be analysed as below :

1. Research is highly purposive. It deals with problems to be solved.
2. Research is expert, systematic and accurate investigation. Data are gathered, recorded and analysed with as complete accuracy as possible.
3. Research usually involves, as a step, a hypothesis or a set of hypotheses concerning the explanation of a phenomenon or the solution of a problem.
4. Research gathers new knowledge or data from primary or first hand sources.
5. Research is logical and objective. The data gathered and procedures employed are verified at each step. Emphasis is always on testing rather than proving the hypothesis through close observation and/or accurate experiment.
6. Research endeavours to organize data in quantitative terms as far as possible, and to express them in numerical measures. Even otherwise, research is carefully recorded and reported. Every term is carefully defined ; all procedures are described in detail ; all limiting factors are

[7] Eric Hylla, *Report of the First International Conference on Educational Research, op. cit.*, p. 32.

fully recognized; all references are carefully documented and all results are objectively recorded.

7. Research places emphasis upon the discovery of general principles and scientific generalizations that can be applied to the solution of a wide range of problems.
8. Research is patient and unhurried and requires great courage and persistence. The researcher is willing to follow his procedure to conclusions that may be unpopular and may bring social disapproval. The research worker must be not only a scholarly and imaginative person but also of the highest integrity, willing to spend long hours, painstakingly, in search of truth and must have courage to express his findings without being influenced by any extraneous considerations.

The rigorous standards of scientific research are evident from an examination of the above characteristics. Educational research, however, cannot always be viewed as strictly scientific, *i.e.*, empirical, inductive and exact. Educational Research acquires, because of the nature of the material handled, a few special features characteristic of all systematic social and mental studies. They may be analysed as below :

1. A sound philosophy of education must form the basis of evaluating any principles and activities of educational research. By reason of the social nature of education, most of the problems are highly complex and its philosophical nature demands that in the solution we must reckon with ultimate values.[8]
2. Educational research deals with the problems of motivation and ethics which admit of varied interpretations and assumptions on the part of the investigator as well as the subjects. Educational Researcher, therefore, needs imagination and insight as much as a scientific attitude of

[8] Robert R. Rusk, *Research in Education : An Introduction*, London : University of London Press Ltd., 1962, p. 86.

Cf. Ibid., p. 93. " . . . in the application of scientific procedure to education, a sound philosophy—as well as a sound commonsense—must be invoked to save the scientific procedure from itself."

mind.[9]

3. The educational arena is inter-disciplinary and an educational problem can require the characteristics of several disciplines—Pyschology, Sociology, History, Economics, Anthropology and Political Science, etc.
4. Much of educational research which deals with historical, philosophical or comparative data involves a good deal of subjective interpretation and deductive reasoning.[10]
5. Social or behavioural sciences like Sociology, Economics and Psychology have not achieved the degree of specification possible in the physical sciences. The method of interview, for example, commonly employed by these sciences still combines art and science.
6. Almost all problems of educators are sociological problems. Social problems present an increasingly large range of variables and a multitude of causes brings about a certain result. Difficulties of manipulating and controlling all the variables outside the laboratory put limits on the exactness and precision of results arrived at in Social or Psychological experimentation.
7. Most educational experiments do not require very costly apparatus, but (*a*) paper and pencil, (*b*) human material—children, (*c*) some mathematical equipment—knowledge

[9] *Cf. Ibid.*, pp. 99-100. "The problems of education are 'telic'—the realisation of ends which are the products of creative imagination and the verification in practice of experiments that have not been tried before. The strictly scientific attitude obscures these issues . . . Education by its reliance on research must never fail to realize that in addition to its practical practitioners and skilled investigators, it stands in need of men and women of imaginative insight, who look beyond the present and behold the vision splendid. If the vision should fade into the light of common day, not only will the people perish, but research itself will become a sterile futility."

[10] *Cf.* Eric Hylla, "The Nature and Functions of Educational Research", *Report of the First International Conference on Educational Research*, *op. cit.* p. 13.

"The sciences of mind commonly use methods of description, explanation, interpretation, sympathetic or intuitive understanding—methods which are mainly speculative and deductive in character and which rarely furnish results that can be subjected to measurement or mathematical procedures."

of elementary Statistics, (*d*) library facilities, and (*e*) facilities for publishing research papers.

8. Educational research is not the field of the specialist only.

> Any teacher with common sense, intelligence and insight can undertake research in a problem. In the beginning such workers may require some guidance and training but this can be made easily available to them at the hand of experts.[11]

The significance and characteristics of educational research, as discussed above, can be easily summed up in the following words of C. N. Patwardhan :

> Progress depending on experience, it is rightly observed, is accidental and slow, whereas research seeks to settle the question here and now and avails itself of experiment rather than experience. Moreover, research further analyses 'experience' and tries to synthesize 'tradition' and abstract forms like 'good teaching' 'creative activity', etc., in a scientific process, the contents and results of which can be used, verified and accepted or corrected, if necessary, by others."[12]

In the words of Principal Lahiri,

> Research economises effort, prevents wastage, increases efficiency and reacts to vitalize and dignify the work of the teacher.[13]

[11] V. V. Kamat, "Can a Teacher Do Research ?", *Teaching*, Vol. XXX, No. 1, Sept., 1947, pp. 3—8.

[12] C. N. Patwardhan, "Educational Research—The principles and Procedures", *Progress of Education*, Vol. XXIX, No. 2, p. 55.

Cf. Madhuri Shah, "Improving Instruction by Research—A Challenge", *Teaching*, Vol. XXX, No. 1.

"Research is a word which frightens a lot of people. It need not. As a matter of fact it is essentially a state of mind—a friendly, welcoming attitude towards change. Research for practical people such as teachers, headmasters and supervisors should arise out of a desire to do things better. It should help them to narrow down the proverbial gap between theory and practice in education."

[13] J. Lahiri, "Research Experiments in Education in India", *Educational India*, Vol. XXV, No. 5, Nov. 1957, p. 150.

Cf. Madhuri Shah. "According to Buckingham, research will (1) powerfully and rapidly develop the technique of teaching, (2) vitalize and dignify the work of the individual teacher, (3) develop professional expertness, open-eyed, open-minded scientific spirit of inquiry, and (4) create new interest and new confidence in his own abilities."

Undoubtedly, significant educational research must, by its very nature, develop a faith in new methods, result in improved educational practices, provide a vision for a better future and promote policies and plans that shall lead to progress.

SUMMARY

1. Research is as indispensable for progress in education as it is for progress in any other field of life.
2. The need for research in education has increased with the changing ideas and the rapid expansion and democratization of education all over the world.
3. Educational research is the application of the principles and methods of scientific research for the solution of problems in the field of education.
4. Educational research is more often applied than fundamental.
5. The characteristics of educational research common with those of scientific research are :
   (*i*) It is highly purposive.
   (*ii*) It is expert, systematic and accurate.
   (*iii*) It involves the formulation and testing of hypotheses.
   (*iv*) It gathers new knowledge or data.
   (*v*) It is logical and objective.
   (*vi*) It organizes data in quantitative terms and records and reports the studies carefully.
   (*vii*) It emphasizes the discovery of general principles.
   (*viii*) It is patient and unhurried and requires a man of integrity, imagination and scholarship.
6. The characteristics of educational research common with those of social, behavioural and mental studies are :
   (*i*) It reckons with ultimate values and ethics and needs a sound philosophy and commonsense.
   (*ii*) It needs imagination and insight as much as a scientific attitude of mind.
   (*iii*) It is interdisciplinary and requires the help of other social sciences.
   (*iv*) It uses speculative and deductive methods to a great extent.
   (*v*) Its procedures are not absolutely exact.

(*vi*) The results are not precise due to the difficulty of controlling a wide range of variables.

(*vii*) It does not usually require costly apparatus.

(*viii*) It is not the field of the specialist only.

7. Indian educationists have well realized and expressed the need and significance of educational research.

QUESTIONS AND PROBLEMS

1. Why is research in the field of education necessary ? How does educational research help in the advancement of education ? Illustrate your answer with examples.

2. "The mere reporting, defining, stating and amassing of facts, even in numerical form, is in itself not educational research." (Eric Hylla). Elaborate upon this idea with reference to the functions and uses of educational research.

3. "Educational research should not be viewed only as scientific research which is empirical, inductive and exact." (Eric Hylla). Discuss this statement in the light of the special characteristics of educational research.

4. What do you understand by the term 'sciences of the human mind' ? Would you consider educational research in the fields of the philosophy of education, the history of education, and comparative education more in the nature of scientific research or of research in 'the sciences of the human mind' ? Why ?

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CHAPTER TWO

Development of Educational Research

Beginnings of educational research. Stages of its development. Its growing national and international dimensions. Major local and national research organizations. Importance and problems of educational research at the international level.

A—Educational Research Abroad : Great Britain ; U.S.A.; U.S.S.R. ; Australia ; France ; Italy ; Japan ; Newzealand.

B—Educational Research in India : historical background of educational reform in India. History of the recent development of educational research—at M. Ed. and Ph.D. level—at the State and Central levels – and the contribution of various foreign agencies. The major organizations and depositories of educational research. The major periodicals and journals in educational research.

Educational research, as it is known today, is a relatively new branch of knowledge. In the educational world, it is only the last fifty years or so that are characterized by increasing readiness to apply methods of research to the solution of educational problems. The rise of democracy and a continuous expansion of education in various countries have been invariably accompanied by more and more research in education. Great Britain and America can very safely be termed as pioneer countries in educational research, where the beginnings of research in education can be traced back to much further than the beginnings of the present century. Impelled by their own educational needs and problems and inspired by the pioneer countries, almost all countries of the world are engaged in some sort of educational research or the other by this time.

Everywhere educational research has passed through several stages in its manner of solving educational problems. The earliest efforts aimed at improvement in the field of education may be labelled as the *personal experience method*, whereby changes of some kind or the other were introduced in educational practices as a result of the experience of certain experienced

educators. This was generally followed by, what may be called, the *deliberative approach* consisting in a discussion of problems leading towards committee action, which system continues even during the present time. The era of *objective measurement* and systematic research in education, destined to revolutionize appraisal and research techniques the world over, is the latest stage.

The major types of research organizations functioning today at the local and national levels, on the basis of the institutions maintaining them, may be listed below :

FIVE MAJOR TYPES OF RESEARCH ORGANIZATIONS AT THE LOCAL & NATIONAL LEVELS, ON THE BASIS OF THE INSTITUTIONS MAINTAINING THEM

1. *Universities :* Faculties, Schools or Departments of Education, Bureau or Department of Educational Research, Institutes of Education and Child Study, etc.
2. *Government Agencies :* Administrative bodies at all levels of Government, *e.g.*, Municipal school boards, state & provincial departments or ministries of education, federal and national offices, departments or ministries, etc.
3. *Autonomous Public Agencies :* Organizations independent of direct governmental control, deriving their funds from a variety of sources ; these initiate and co-ordinate research, train research workers, etc.
4. *Voluntary Professional Associations :* Teachers' associations, school board associations, advisory councils or committees.
5. *Private Concerns :* consulting organizations, text-book publishers, test publishers, etc.

By now educational research seems to have developed to a stage where the findings of one country in this field must have their impact on the educational systems of other countries. International co-operation, communication and organization have become problems of real importance. The First International Conference on Educational Research held at Atlanta City, New Jeresy, U.S.A., in 1956, discussed the problem of developing international collaboration in educational research. In this Conference eleven countries were represented

This was followed by another International Conference held at Tokyo in 1959, in which more than forty delegates participated from various countries. They disclosed and discussed the status and problems of educational research in their respective countries. These conferences and the literature they have occasioned indicate the quick development of ideas and practices in educational research in various countries. They also emphasize the great need for, and the many problems and issues involved in, a systematic organization and development of research on a world-wide basis. They attribute the failure of educational research in playing a major role in the establishment and development of educational systems to three likely causes, *viz.*, lack of awareness of the need for educational research, lack of faith in its results and lack of funds to support educational projects. These causes, on all local, national and international levels, have resulted in much educational research being of a fragmentary character, which fact was greatly deplored by the delegates to the International Conference at Tokyo. However, there is clear evidence of attempts being made on national and international levels to do away with the causes that stand in the way of the progress and development of educational research.

For a satisfactory *organisation of research at the international level,* the following conditions seem essential :

1. The stimulation, assistance and sponsorship of research by an international agency like the Unesco must be sought.[1]
2. Member States must be made aware of the need, importance and mutual value of this co-operation.
3. Meetings and other facilities for planning co-operative research must be arranged.
4. Aid in planning worthwhile research and in securing technical assistance will be required.

It might be worthwhile to have a bird's eye view of the development and status of educational research in some

[1] Under the Special Services Section of the Unesco Department of Education, it is planned to assist recognized research organizations in promoting educational research, especially in the field of teaching modern languages.

countries abroad before studying the position of educational research in our own country.

A. Educational Research Abroad

1. GREAT BRITAIN

The year 1888 is postulated as the year of the origin of educational research in Great Britain, when Sir Francis Galton investigated into *mental fatigue*. In 1896 the Board of Education got interested, published special reports, and created a sub-committee on *Psychological Research in Schools*. The development of direct educational research, however, took place from the second decade of the present century after Binet's invention of the Intelligence Scale in 1905 and Terman's revision of it in 1916. In 1917, H.O. Rugg published his *Statistical Methods Applied to Education* and ushered in the gradual freeing of Educational Research from the domination of Experimental Psychology. In 1920, the first issue of *Educational Research, a supplement to 'The Head Teachers' Review'*, was published through the efforts of the *Research Committee* instituted under the *London Head Teachers' Association*. A *Committee for Research in Education* was founded in 1922 by the British Psychological Society for Research in Education. In 1925, *The Forum of Education* (now incorporated in the *British Journal of Educational Psychology*) published an account of the Committee's work upto that date under the title the '*Progress of Research*'. The years following have seen a steady development of educational research marked by three important features :

(1) adoption of the techniques of scientific research evolved in psychological laboratories ;

(2) application to educational data of statistical methods of analysis ;

(3) the origin and development of mental testing and measurement.

The National Union of Teachers, the Local Education Authorities and the Education Committee co-operated in this field. Many successful investigations on individual differences, group tests of attitude, interests and achievement using highly elaborate methods of statistical analysis have been completed.

A *Foundation for Educational Research* was established in 1942. It prepared the way for the *National Foundation for Educational Research in England and Wales* set up later. The Education Act of 1944 empowered the Minister of Education and Local Education Authorities to conduct and aid educational research.

In Scotland the *Scottish Council for Research in Education* was instituted in 1928. But much earlier than that, in the year 1919, the Educational Institue of Scotland had appointed a *Research in Education Committee.* The Scottish Council for Research in Education, very representative in its constitution, has virtually superseded the Research in Education Committee and has been functioning with great success ever since its inception.

The organization and depositories responsible for educational research in the United Kingdom at present are the following :

1. *National Foundation for Educational Research in England and Wales,* which organizes, co-ordinates and carries out research in education of a national character. It maintains a register of current researches into educational topics and issues various publications.
2. *Scottish Council for Research in Education* which initiates and carries out all forms of educational research and disseminates to all interested in Scotland and elsewhere, the results of researches. It issues various publications.
3. *The Institutes of Education*—in the Universities of Birmingham, Bristol, Cambridge, Durham, Exeter, Hull, Leeds, Leicester, Liverpool, London, Manchester, Nottingham, Oxford, Reeding, Sheffield and Southampton – devote much attention to research in education. Most of the Institutes publish Studies and Bulletins reflecting the work and findings of educational research.

The important journals and periodicals of educational research current in the United Kingdom are :

1. *British Journal of Educational Psychology*, published thrice a year by Methuen and Co., 36, Essex St., Strand, London, W. C. 2.
2. *British Journal of Educational Studies,* published twice a year by Faber and Faber Ltd., 24, Russel Square,

London, W. C. 1.

3. *Bulletin of the National Foundation for Educational Research in England and Wales,* published twice a year by the National Foundation, 79, Wimpole Street, London.
4. *Educational Research,* published twice a year since Nov. 1958, for the National Foundation, by Newness, Educational Publishing Co., Southampton Street, Strand, London, W. C. 2.

2. UNITED STATES OF AMERICA

The United States saw in the third decade of the present century the publication of *Ten Years of Educational Research (1918-1927)* by Walter Monroe who characterized the period before 1918 as the 'Pioneer Period' in educational research. Having its roots in the early years of the present century, educational research has developed steadily and rapidly ever since the establishment of the *American Educational Research Association* in 1920 and the introduction of the *Journal of Educational Research.* Within a quarter of a century a wide variety of instruments for research and appraisal in education were published. *The Third Mental Year Book* published in 1949, lists 663 tests and 549 books on measurement and related subjects. This is the period characterized by extraordinary stress on the process of collecting, analysing and quantifying educational data.

The contributions of Thorndike and J. M. Rice are invaluable in the history of educational research. Thorndike and his followers developed the tools of research while Rice gave the initial impetus to the movement for agencies of educational research. Under Rice's direction an *Educational Research Department* was established. The Colleges and Universities of America have been carrying out many a research project successfully. *Review of Educational Research,* started in 1930, publishes a digest of important research reports. The U. S. Office of Education made public the results of the University Research Projects carried out all over the country to study about forty educational problems. Numerous papers, periodicals, monographs and books are published by various agencies in the U. S. A. every year on researches in education. Financial assistance in educational research is provided by numerous

organizations in the form of scholarships, fellowships and outright contributions to deserving native and foreign scholars. Important national bodies, organizations and depositories in this field are:

1. *American Council on Education, Washington,* which aids in channelling funds of Foundations and of other sources into worthy research projects. It participates actively in educational research and issues various publications.
2. *American Educational Research Association, Washington,* a department of the National Education Association, which issues various publications on research findings including a series on 'What Research Says to the Teacher'.
3. *Educational Testing Service, California* which builds, analyses and validates tests, prepares interpretative materials, improves existing materials and engages in extensive research to advance testing theory and develop techniques of evaluation. It also supplies tests to schools and educators.
4. *National Association Research Division, Washington.*
5. *National Society for the Study of Education, Illionis.*
6. *Phi Delta Kappa, Indiana,*
7. *Science Research Association.*
8. *United States Office of Education, Washington,* which organizes applied research directed toward the immediate educational problems. It disseminates educational statistics, maintains a library containing an extensive collection of educational theses and dissertations for graduate degrees. It issues many publications.
9. *University Microfilms, Michigan,* which acts as a microfilm service in storing and reproducing doctoral dissertations for some seventy co-operating institutions.
10. *Other Important Agencies :*
    (a) City School Systems.
    (b) Institutes of Higher Learning.
    (c) State and Territorial Departments of Education.
    (d) State Professional Education Associations.
    (e) Foundations like the Carnegie group, the Rockefeller group, the Commonwealth Fund and the Ford Founda-

tion Fund for the Advancement of Education, and the Kellogg Foundation.

(f) Clinical, Guidance and Testing Bureaus.

Research Journals and Periodicals on educational research in the U.S.A. are :

1. *California Journal of Educational Research*, published 5 times every year by California Teachers' Association for the California Advisory Council on Educational Research.
2. *Educational and Psychological Measurement*, published 4 times a year by the College Station, Durham, North Carolina.
3. *Journal of Eductional Psychology*, published 8 times a year by Warwick and York, Maryland.
4. *Journal of Educational Research*, published 9 times a year by Dembar Publications, University of Wisconsin, Madison, Wisconsin.
5. *Journal of Experimental Education*, published 4 times a year by Dembar Publications, University of Wisconsin, Madison, Wisconsin.
6. *The Phi Delta Kappan*, published 9 times a year by the Phi Delta Kappa, Illinois.
7. *Research Bulletin of the National Education Association*, published 4 times a year by the N.E.A., Research Division, Washington.
8. *Review of Educational Research*, published 5 times a year by the American Educational Research Association.

3. U.S.S.R.

The rapid advancement in the educational system of U.S.S.R. within the last couple of decades is no matter of chance. Systematic planning and scientific research in the field of education are at the back of the present Soviet educational system. The *Academy of Pedagogical Sciences*, set up by the decision of the Soviet Government, in October 1943, controlled by the Ministry of Education, RSFSR, carries out systematically a lot of educational research in fields including the history of education, special schools, teaching methods and psychology. It publishes since 1950 a quarterly bibliographical guide and yearbook of educational lectures. The Academy works through a number of scientific research institutes mentioned below :

1. *The Institute for the Theory and History of Pedagogy*, which works out the basic problems of pre-school, intermediate and older age groups of children in school and at home, and studies the history of education in the Soviet Union. It also provides information on these subjects. A special section of this Institute is devoted to contemporary education and schools in foreign countries.
2. *The Institute of Educational Methodology*, which engages itself in researches mainly regarding the content of general and polytechnic education, the teaching methods for the individual subjects and the methods of adult education. It also disseminates information relating to individual methodologies.
3. *The Institute of Psychology*, which deals with, and provides information on, problems of general, age-group and educational psychology.
4. *The Institute of Artistic Education*, which studies scientifically and reports on the problems and patterns of aesthetic training in general schools and in out-of-school art training.
5. *The Institute for Physical Education and School Hygiene*, which tackles experimentally the problems relating to the theory and methods of physical education and school hygiene and disseminates information in this regard.
6. *The Institute for Training of Handicapped Children*, which concerns itself mainly with research in the education of the deaf, the dumb, the blind and the mentally retarded, and with a clinical and pathological study of pupils in special schools
7. *The Leningrad Institute of Education*, which deals generally with questions relating to the education and training of children of different age-groups.
8. *The Institute for National Schools*, which is concerned with questions relating to methods of teaching the various regional languages, and the Russian language, in national schools.
9. *Institutes for Educational Research and Institutes of Psychology* are no less important agencies of research in education. They carry out systematic research and methodo-

logical studies; they collect and disseminate educational documents and information, and also organize reference bibliographical services.

4. AUSTRALIA

In Australia, the *Council for Educational Research* was established as early as 1930. It not only collects, digests and interprets educational facts and statistics, but also seeks to promote research and investigations into problems of Australian education. To this Australian Council for Educational Research are attached *Institutes of Educational Research* in all the six states.

Commonwealth Office of Education is another important agency of educational research which conducts research and gathers and circulates information on such educational matters as have a commonwealth-wide application, *e.g.*, teaching of English as a foreign language, technical education, teachers' salaries and conditions, educational finance, etc. Besides, the State Education Departments in all the six States maintain separate Research Sections for the investigation of specific problems within their own systems of education.

The faculties or departments of education in almost all the universities of Australia conduct research and investigations into significant problems of education in the country.

The following Research bibliographies and Journals current in Australia indicate the extent to which educational research has been carried on in the country:

1. *Educational Research being undertaken in Australia,* published in Sydney by the Commonwealth Office of Education, is an Annual feature.
2. *Theses in Education and Educational Psychology accepted for Degrees at Australian Universities, 1919-1950* and its supplement, were published by the Australian Council for Educational Research in 1953.
3. *A C E R Test News* published twice a year by the Australian Council for Education, Test Division.

5. CANADA

Canadian universities have not lagged behind in educational research. Most faculties or departments of education in the

Canadian universities conduct some kind of educational research. Sources of information are usually found in the annual reports of the universities. Besides, the University Departments of Education, there are in the country the following special research organizations that carry on educational research :

1. *Alberta Advisory Committee in Educational Research* which recommends research projects to the Alberta Committee in Educational Research at the University of Alberta. It is composed of the representatives from the Department of Education, Alberta University, the Alberta School Trustees' Association, the Alberta Teachers' Association, and the Alberta Home and School Association.
2. *Canadian Education Association* which fosters and reports on educational research in Canada.
3. *Canadian Research Committee on Practical Education.*
4. *Canadian Teachers' Federation, Research Division.*
5. *National Advisory Committee on Educational Research.*

The three main periodicals on educational research in Canada are:

1. *Alberta Journal of Educational Research*—a quarterly journal.
2. *Canadian Research Digest*—a quarterly published by the Canadian Educational Association.
3. *The Ontario Journal of Educational Research*—a biennial issue published by the Ontario College of Education, University of Toronto.

6. FRANCE

In France agencies of educational research exist at university, national and international levels. *A University Bureau* does research in vocational guidance at the secondary and higher education levels and issues various publications. *The National Institute of Pedagogy* functions as the national documentation and research centre for France. It engages in educational research work at all levels in conjunction with individuals and bodies undertaking research and experiments. A section of this institute studies the effect of cinema, radio and television on education. There are some other bodies conducting

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research in education, which are attached to large scientific establishments. But more important than these is *the International Centre of Pedagogy* which, in liaison with the National Institute of Pedagogy, specializes in research work at the secondary level.

As many as nine major research journals and periodicals issued by different agencies of educational research are current in France.

7. ITALY

The main educational research organization in Italy is a Ministry of Education instrument divided into many sections, while there are two other important research agencies working side by side with the central one. The central educational research organization includes the national school museum, the national library, a section on literature for children and youth, a section on special schools, and one in experimental psychological research. It organizes annual courses of study, seminars and exhibitions, keeps in touch with centres in other countries, and issues many publications.

Apart from the general centre for study and documentation referred to above, there are a series of specialized centres concerned with (a) nursery education, (b) primary education, (c) lower secondary education, (d) upper secondary education, including classical, scientific, and teacher training, (e) technical education, and (f) promotion of collaboration between school and family.

Then there is an educational association at Florence, which studies problems of a pedagogical nature, and a 'Pedagogium' at Milan which studies theoretical and practical problems in Education.

The above agencies and some others publish, every year, a good deal of literature in the form of educational journals and periodicals, of which four are quarterlies, seven have six issues per annum, and one is a monthly.

8. JAPAN

A large number of agencies are concerned with educational research in Japan:

1. National Institute for Educational Research.

2. Federation of Societies for Educational Technique.
3. Institute for Science of Education.
4. Tokyo Noma Educational Research Institute.
5. Ohtomo Educational Research Institute.
6. Tanaka Institute for Educational Research.
7. Tokyo Educational Research Institute.
8. All Japan Federation of Special Education Research Institute.
9. National Educational Research Association.
10. Institute for Special Education Research.
11. The faculties of education of the Universities of Hiroshima, Kyoto, Kyusha, Tohoku and Tokyo also patricipate in educational research and publish various bulletins and studies.

An equally rich crop of educational periodicals includes the following:

Children's Psychology and Mental Hygiene, a monthly published since 1950.
Educational Techniques.
Educational Research.
Educational Psychology.
Studies in Pedagogy.
Institute Bulletin, and
Bulletin of the Research Institute of Comparative Education and Culture.

9. NEW ZEALAND.

The Council for Educational Research started functioning successfully in the field as early as the third decade of this century. From 1934 to 1939, in the first five year period of research, the organization and administration of school system in the country was the subject of research. In the second five year period a study of educational practices including curriculum, methods and school administration was carried out.

The Council for Educational Research is an independent non-governmental organization which carries out research on educational matters in the country. It publishes reports and findings of research in:

1. *Educational Research Series.*
2. *Studies in Education.*

In 1947, the council had published a *Bibliography of New Zealand Education*, which was revised later. It lists educational publications including theses and various educational studies.

The above account of educational research in some of the countries abroad is neither comprehensive nor exhaustive. It is only indicative of some of the landmarks in educational research conducted in some of the countries of the world engaged in educational research. As many as fourty-four countries were a subject of survey made by the UNESCO in this connection, information about which is included in the publication, *Research in Education*, Education Abstracts, Vol. IX, No. 2, February 1957, which could be referred to with advantage by research workers in need of information about more countries.

B—Educational Research in India

"We have recognized rather late in our scheme of education the importance of research", D.T. Chitranjivi:[2]

In India the origin of Educational Research is very recent. Development of educational research, organization of special institutions and provision of special courses in this field is almost a post-independence feature. Compared to most of the other countries, educational research in our country is still in its infancy.

For a proper understanding of educational research, an outline of the historical background of educational reform in the country may be useful. To quote D.T. Chitranjivi:

> One may trace back the earliest beginnings of educational research in India to the first decade of this century when Baroda introduced compulsory elementary education throughout the State in 1906 and Hyderabad experimented in University Education through Urdu. At the close of World War I many Universities began to organize programmes for rapid development of Indian Education. Tagore was the forerunner of the new spirit of synthesis in the East and West in Vishwa Bharati. The Jamia Millia, The Banaras Hindu University and the Muslim University at Aligarh followed suit. The Calcutta University Commission of 1916 changed a good deal of both the content and organiza-

[2] D.T. Chitranjivi, "Some Problems and Projects in Educational Research," *Teaching*, Vol. XXX, No. I, Sept. 1957.

tion of Secondary and University Education. The Montford Reform of 1919 aided the new features. In the sphere of Elementary Education Mahatma Gandhi introduced the Basic Scheme—formerly known as the Wardha Scheme. Immediately after the declaration of Independence, two Commissions were appointed by the Government of India—one for University Education and the other for Secondary Education. Both the Commissions have recommended research—intensive as well as extensive—with regard to important educational issues.[3]

The Report of the University Education Commission published in 1949 pointed out that till then not much systematic research in education was being carried on in India. It classified the three main agencies of educational research, functioning however unsatisfactorily, in the country as below:

1. Some Universities which provided M. Ed. courses. They required a piece of original work in educational research which was found 'small and scrappy' and of not much value in the strictet sense, yet good enough to start with.
2. The Staff of some Training Colleges or Departments who were engaged seriously in original work—sometimes of high quality—but isolated due to the lack of inter-university planning.
3. Some centres for advanced work in Education and Educational Psychology like the Central Pedagogical Institute, Allahabad, Education Department, University of Patna, and the Central Institute of Education, Delhi.

Dr. P. S. Naidu, in his paper on *Research in Education* presented at the First Conference of Training Colleges in India held at Baroda in 1950, remarked :

> As I glance at the excellent summary of educational research in our country published in the Indian Journal of Educational Research, I find evidence of a very great enthusiasm for adventure in education, which, of course, is welcome, but there is little or no planning. There is discernible in these research endeavours a certain restlessness and a straining after an undefined goal.[4]

Since the publication of the University Commission Report and the First Conference of Training Colleges in India educa-

[3] D. T. Chitranjivi, *ibid.*

[4] P.S. Naidu, "Research in Education", *Report of the First Conference of Training Colleges in India*, Bombay, Indian Institute of Education, 1951, p. 1.

tional research in India seems to have become increasingly popular with the Indian universities, and to have gained a very great impetus from the Central and State Governments. T.K.N. Menon, writing in 1955 about research in education in Indian universities, reported as follows :

> A good number of the Universities in India have in recent years approved of courses leading to the Master's Degree in Education. One of the requirements for the award of the degree is that the candidate for the degree should do a certain amount of research in education. This research may be of two types, viz., (1) research on a topic leading to a thesis in which case the candidate is not required to specialize in any other subject and to appear at any other examination, (2) research in a topic leading to a dissertation which needs to be supplemented by three or four papers in which the candidate will be examined . . . . The difference between the research done at the thesis and dissertation levels varies in the nature of the topics chosen, the intensity and depth of research done, and consequently in its quality. Provision of courses for the Master's Degree in Education by dissertation and papers is much more frequent in Indian Universities than that by thesis.
>
> Whether it be for preparing a thesis, or for writing a dissertation, the amount of research done by candidates in our Universities is very impressive *in quantity*. If only the quantity could be accompanied by some standard in quantity, the research would be of tremendous consequence to the solution of the large number of problems in Indian education.[5]

Again,

> No one can deny that research in education done for the Master's Degree if properly organized has tremendous potentialities.[6]

Of the M.Ed. research work, Chitranjivi reported :

> Most of the researches carried on by students of the M. Ed. Degree course in various Universities are with reference to the content of the curriculum, to subject matter, child-development, text books, the Basic Scheme of Education and even administration. In the University of Madras nearly 203 theses were submitted between 1945 and 1957 by students. From year to year progressively more research is being done at this stage in training colleges but there is no way of disseminating information on the work done by the students. At the present moment what is needed is a co-ordination of the research done at the M. Ed. stage and projects of research carried on in training colleges under the Ministry of Education. Such a plan will result in economy and careful planning with due attention to present needs.[7]

[5] T.K.N. Menon, "Research in Education in Indian Universities" (Ed.), *Journal of Education and Psychology*, Vol. XIII, No. 1, pp. 1-4.

[6] *Ibid.*

[7] *Op. cit.*

In still recent years more and more Universities have started M. Ed. and Ph. D. courses in Education. The Institute of Education at Bombay, some years back, attempted a consolidated review of research in education in all the states of India, and in its Journal published periodically a list of research topics undertaken or contemplated by Universities in India and abroad on educational problems at various levels. Since 1950 or so, research in education has made great progress and the amount of research work carried out by student-teachers and research scholars in relation to problems of education in India is appreciable.

Dr. M.Z. Khan, writing in 1959 on Research in Education reviewed the contribution of the Central and State governments to educational research in recent years. *Indian Journal of Educational Administration and Research*, in its Winter Issue of 1960, gives an account of the progress of research work done at the central institutes of education from 1947-60.

> The post-independence period has seen the establishment of a number of central institutions for research, training and extension in the appropriate educational fields. The oldest of these institutions is the Central Institute of Education which was set up in 1947. The year 1954 saw the establishment of the Central Bureau of Text Book Research and that of Educational and Vocational Guidance since merged in the Central Institute of Education. The National Institute of Basic Education and the National Fundamental Education Centre came into being in 1959.

In addition to the institutions mentioned above, the Central Institute of English, Hyderabad, was also set up in 1958 for purposes of research and training in the teaching of English as a second language. The Departments of Extension Services set up in many training colleges by the All India Council for Secondary Education (now replaced by the Directorate of Extension Programmes for Secondary Education), have also been instrumental in much significant work in connection with educational research in different aspects of secondary education.

For the specific purpose of promoting educational research in training colleges, the First Five Year Plan earmarked in 1953-54 a large sum of money to start a special Scheme under the name of *Research Projects for Promotion of Research in Training Colleges*. The Scheme in the first instance, gave

impetus to more than twenty training colleges all over the country. The first seminar on this subject held at Ootacamund in 1956 reported the work of thirteen units and recorded the work of eight units which were not represented. That Seminar was followed by another held at Bangalore for the years 1958-59 and 1959-60.

In June 1961, a conference of the Principals of Training Colleges was held at Bangalore which made a number of recommendations on educational research in the third five year plan. The conference recognized the importance of and need for well planned and well co-ordinated research into educational problems. It made the following recommendations in this regard :

1. To set up a standing committee which would solely devote itself to the problem of research in education.
2. To review periodically the research work carried on by Training Colleges and Universities.
3. To start a journal of its own devoted to this and other related subjects.

The Second and Third Five Year Plans have continued and expanded the Scheme further to include more training colleges and other projects than those sanctioned in the beginning.

During the first two Plans, under the scheme, grants were given to teacher-training colleges and departments of education in universities to conduct research mainly in problems connected with secondary education. Occasionally, exceptions were made and grants were given for research in problems other than those of secondary education and also to institutions other than training colleges or university departments of education. In the third Five Year Plan, the scheme will be continued on a wider scale. On the one hand, grants will be given to any recognized educational institution which, in the opinion of the Ministry of Education, is competent to undertake the research project proposed ; and on the other, the field of research also will be widened, so as to include problems connected with pre-primary, primary, basic and secondary education.

The main purpose of the scheme is to develop research-mindedness in educational institutions by assisting teachers to undertake and carry out research projects which cannot be

carried out at present for want of funds. Therefore, under this scheme no aid is given for the creation of new departments, or for payment of any allowances to staff, undertaking research projects.

Not many years ago, a *Central Research Advisory Committee* was formed to co-ordinate the activities of the various institutions working under the Central Government. A *National Research Advisory Council for Education* has also been functioning under the Union Education Ministry. Recently has been set up a *National Council of Educational Research and Training*[8] to promote and co-ordinate educational research in the country. As a first step towards this goal, a *National Institute of Education* has been established at Delhi.

To encourage students of merit to carry out research in important problems of Indian Education, substantial financial help has been given in the form of scholarships and fellowships by the Government and Universities. Many persons in the teaching profession have benefited from financial aids from several foreign agencies and schemes. Of these mention might be made of the Ford Foundation, the British Council, the Institute of Education, London, the Commonwealth Student Exchange Programme, the UNESCO Exchange of Persons Programme, Colombo Plan, and the Indo-U.S. Technical Cooperation Mission. Since 1951, the Ford Foundation has been assisting India in her programmes of advancement on many fronts. Expansion of educational research has been directly affected by an international team of experts sent by the Ford Foundation to study the problems of secondary education in other countries of the world with regard to the training of teachers and the curricula of secondary schools. Moreover, it is in cooperation with the Ford Foundation that the Ministry has not only been able to set up some institution of educational research but also to support some projects in secondary and rural education.

The contributions of UNESCO in promoting educational research in our country have also been significant. It has supplied us with experts, finances and equipment in many

[8] More details given on pp. 33-34.

areas and activities of educational research. 'Men, money and materials are flowing into India to assist our educational efforts.' Many educational seminars and research projects have been possible in recent years because of the aid from UNESCO.[9] The UNESCO Coupon Scheme has made it possible for India to benefit by setting the necessary equipment for the advancement of educational research, educational literature, instructional materials and films.

The contribution of the Central Government to the promotion of educational research has been made in other ways too. Improving and extending the facilities provided by the *Central Educational Library* and the starting of an *Educational Abstracting Service* which publishes, since September 1955, a Quarterly Bulletin entitled the *Indian Education Abstracts* have been of real help to educational research workers. *The Documentation Services, Central Secretariat Library, Ministry of Education,* have recently started publishing *Bi-monthly Abstract of Foreign Educational Literature,* and *The Indian Education Index*—a monthly subject index to a selected list of Educational Periodicals published in India. These have proved of great value as guides to educational literature for research workers.

Indian Journal of Educational Administration and Research started lately deals with problems of both educational administration and research and thus attempts to coordinate the two fields. Its first issue appeared in July 1960, published by the Ministry of Education, Government of India. It is expected that this journal would fulfil a real need.

A project to compile a *Union List of Educational Periodicals* is already on its way and bibliographical information for about 1300 theses and dissertations submitted to various Indian Universities has been collected by the Ministry of Education. Abstracts for about 600 of these studies are ready for publication and more are being prepared. *A Register of Educational Research in India* published in the *Literature Notes* abstracts

[9] For example, a seminar on the problems of Maladjustment of Adolescent Students to their Academic and Social Surroundings held at Hyderabad in 1955; a seminar on the Role of Arts and Crafts in Education; a pilot project on the development of the Radio Forum as a means of Fundamental Education in Bombay; and a project on the Production of Reading Materials for Neo-Literates.

several theses on education. Bibliographies on various subjects of Education—science education in elementary and secondary schools, religious and moral education, research in education, etc.—have been prepared.

The major organizations and depositories of Educational Research functioning in India are the following :

(1) *Central Institute of Education, Delhi*, founded in 1947 to act not only as a teacher-training institution but as 'a research centre for solving problems of the country' as well. It provides post-graduate courses in education and carries out research on educational problems. Its Psychology Wing, since 1950, is engaged in preparing and standardizing different types of tests—*viz*, the C.I.E. Individual Scale of Intelligence for ages 3+ to 15+, Verbal Group Tests of Intelligence for age groups 11+ to 14+, a non-Verbal Test of Intelligence for group 10+ to 14+, and Standardized Tests in Hindi, English and Science. One of its sections has carried on experiments with school equipment and furniture, and the Visual Education Wing has developed visual aids of various types. Attached to the Institute are an Experimental Nursery School and an Experimental Basic School. Another unit has been engaged on a study of the vocabulary used by the adult rural population of Delhi State in order to prepare suitable literature for them. About 200 M. Ed. dissertations on educational subjects have been prepared at the Institute within the last decade or so, and five students have so far got their Ph. D. theses completed. About thirty Ph. D. Scholars are at present on the rolls of the Institute studying various educational problems. The Extension Services Department and the Research Wing have worked in collaboration on big and small educational projects. Of these the Project on Reading for Pleasure has been very extensive.

The Central Bureau of Text Book Research and of Educational and Vocational Guidance, working uptil now as separate organizations have been made part of the Central Institute of Education since the end of 1960. The Ministry of Education, Government of India, has for some time been contemplating a reorganization of the Institute in such a way that more facilities, time and attention could be given to educational research than at present.

The Institute has been publishing, from time to time, 'Studies in Education and Psychology' which report some of the important researches and papers contributed by students and staff.

(2) *Central Bureau of Text Book Research* which was started as a separate Research Bureau of the Ministry of Education in 1954 has now become a department of the Central Institute of Education. Its main task is to study the existing text books, to find out their shortcomings, to formulate criteria of evaluation and reform in text books—their vocabulary, content, presentation, publication, illustration, etc. It has published some useful literature such as *State Text-Book Production in India*, *Text Book Selection Procedures in India* and *Improvement of Curriculum in Indian Schools*.

(3) *Central Bureau of Educational and Vocational Guidance*—engaged at present in preparing tools like (i) Science Selection Battery, (ii) Government of India Merit Scholarship Tests and (iii] Guidance Battery—also began as a separate agency under the Education Ministry in 1954. It too has now become a part of the Central Institute of Education. The Bureau has completed and reported on the following investigations :

Vocational Maturity of School Leavers at the end of class VIII and Practice Effect of Taking Revens Matrices on NIIP 70/23 and vice versa.

(4) *The National Institute of Basic Education, Delhi,* established in the year 1956, is getting substantial equipment and the help of an expert through the UNESCO. It has completed work on seven major projects so far :

(i) Measuring Educational Potentiality of Crafts.
(ii) Difficulties of Teachers in Basic Schools.
(iii) Evolving Targets for Crafts for Basic Schools.
(iv) Developing a General Frame-work of Correlated Syllabus for Basic Schools.
(v) Relative Costliness of Basic and Non-Basic Education in Delhi.
(vi) Analysis and Evalution of some integrated Syllabi and
(vii) Study of Trends in Basic Syllabi.

Other research projects in progress are :

(i) Analysis of Language Readers in classes I & II of Basic Schools of Hindi Speaking States ;

(ii) Preparation and Standardization of Checklist-cum-Rating scale for Qualitative Assessment of Basic Schools ;

(iii) The Utilization of Central Grants for Basic Education during the Second Five-Year Plan and

(iv) Working out Unit Cost of Starting a Basic School.

Basic Education Abstracts on research in Basic Education was started by the N.I.B.E. in 1957 as a Bi-annual publication. The N.I.B.E. has also prepared and published a Basic Education Bibliography.

(5) *The National Fundamental Education Centre* started in 1956, has completed two research projects so far—one on Village Meeting Places, and the other on Community Centres. It has also studied the reading interests and habits of villagers, the health habits of villagers and the impact and evaluation of television programmes and has made a survey of the living conditions in two villages in Mehrauli Block.

(6) *The National Institute of Audio-Visual Education.* Having started its work but recently, it has been engaged in a normative study of the merits of certain projected aids and in some experimental work in the laboratory of the Institute. It has evolved the following aids so far :

(i) the glass black-board,

(ii) reflection-transmission couplet pictures which could be used in rural areas,

(iii) the 16 mm. filmstrip which can be projected on smaller projectors, and

(iv) the sun projector to be used in classroom during the sunlight hours.

Recently, it has been decided to add a separate research and evaluation unit to the Institute which will enable it to expand its research activities.

(7) *National Institute of Education.* The Government of India set up, in July 1961, an autonomous body called the *National Council of Educational Research and Training.* A National Institute of Education has been set up by this Council to conduct educational research, to train educational personnel at an advanced level and to carry on related extension and field services.

The Institute is located in Delhi and is affiliated to the Delhi University. A number of central institutions including the Central Institute of Education, the Central Bureau of Textbook Research, the Central Bureau for Educational and Vocational Guidance, the National Institute of Basic Education, the National Fundamental Education Centre, the National Institute of Audio-Visual Education and the Directorate of Extension Programmes for Secondary Education, have been amalgamated with the National Institute, which will develop an integrated programme.

The National Institute's programme of training will be designed to serve as a model for teacher education programmes and as one of the sources of supply of highly trained professional personnel for training colleges, research institutions and educational administration. It would cover pre-service training for B.Ed., M.Ed. and Ph. D. courses as well as in-service training of key personnel at all stages of education.

The Institute will have a number of departments for training and research in specialized fields—social and philosophical foundations and comparative education; psychological foundations; educational administration; curriculum, textbooks and methods of teaching; science education; basic and elementary education; fundamental education; audio-visual education—and a department of instruction.

(8) *The Central Institute of English, Hyderabad* started by the Ministry of Education with the help of the British Council and the Ford Foundation a couple of years ago has been engaged in giving short term advanced courses in the Teaching of English as a Second Language to teachers and lecturers, as well as in advanced research in the field. It has undertaken such research work as the following:

(i) Initiation of research on Vocabulary Test for Pre-University Class students.

(ii) Reinforcing language teaching through comprehensive material.

(iii) Selection of suitable English vocabulary for Secondary School Children.

(iv) Formulating a structural syllabus in English for secondary schools, and

(v) A syllabus for the course in English for the professional year.

(9) *The Psychological Research Wing, Research and Development Organization, Ministry of Defence.* Much of its research work in the fields of personality assessment and intelligence testing, etc. is related to educational research.

(10) *The Central Pedagogical Institute, Allahabad,* especially, its *English Language Teaching Department.* The latter has been engaged on research in curriculum, syllabus, methods and materials in the teaching of English to the middle classes in Uttar Pradesh.

(11) *Bureau of Educational and Psychological Research, David Hare Training College, Calcutta.* It formulates and standardizes intelligence, aptitude and attainment tests and investigates into various problems which the Bengal Government deems necessary. It issues occasional publications too.

(12) *Indian Institute of Education, Bombay*, founded in 1948, carries on a great deal of research in education. It has issued various publications and studies on educational research. *The Indian Journal of Educational Research* started in 1949 (discontinued after a couple of years) and the *Macmillan Pamphlets* giving the Summaries of Educational Research carried out in the University of Bombay have been a result of its efforts.

(13) *Departments of Education.* The Departments of Education in many Training Colleges, and those affiliated to many a University in India are engaged in much useful research in Education at the M. ED. and Ph. D. levels. The members of the staff of these departments too have carried out a considerable amount of research work in education. The Education Department of the University of Allahabad and Vidya Bhawan Teachers' College, Udaipur publish and circulate an annual report of their educational studies. The Faculty of Education and Psychology, University of Baroda, has to its credit a considerable amount of significant educational research and publication in the field. The Education Department, Lucknow University; Prantiya Shikshan Mahavidyalaya, Jabalpur; Radhanath Training College, Cuttack; Meston Training College, Madras; Wellington Training College,

Madras ; College of Education, Hyderabad ; Department of Education, University of Kerala ; Teachers' Training College, Banaras Hindu University ; Women's Training College, Agra ; the Balwant Rajput College, Agra—all these have also made their appearance in the field.

(14) *Extension Service Departments.* Their contribution to the promotion of research has been particularly in stimulating research-mindedness among teachers in schools. They have organized Research Study Circles for training college and other personnel engaged in research. They have also conducted seminars to guide teachers to carry on research (action research) to solve the problems they face in schools.

The major Journals and Periodicals in Education which are wholly or mainly devoted to reporting on research in Education carried on in the country are the following :

1. *Education and Psychology/Shiksha aur Manovigyan,* which was published as a research quarterly by Mansayan, Delhi from 1954 to 1960. Its place is to be taken by *Manas* very soon.
2. *The Journal of Education and Psychology*, published quarterly, till recently, by the Faculty of Education and Psychology, M.S. University of Baroda.
3. *The Indian Journal of Educational Research,* which started in 1949, was edited by the Institute of Education, Bombay, and published by the Asia Publishing House, Bombay. Reporting on educational research under way or completed in India, and on educational research on Indian topics in universities abroad, it was certainly rendering a much needed service but unfortunately it did not continue for very long.
4. *Short Publications issued by Departments of Education carrying on educational research.*

   (i) *Researches and Studies*—earlier termed Research in Education—is published by the Education Department, University of Allahabad.

   (ii) *Studies in Education and Psychology*—issued by the Central Institute of Education, Delhi.

   (iii) *Vidya Bhawan Studies*—issued by Vidya Bhawan Teachers' College, Udaipur.

(iv) *Research in Education*, at Prantiya Shikshan Mahavidyalaya, Jabalpur.

(v) *Studies and Investigations in Education,* Women's Training College, Dayalbagh, Agra.

5. *Indian Journal of Educational Administration and Research*—A quarterly journal started in 1960, by the Ministry of Education, Government of India, is published in Spring, Summer, Autumn and Winter annually. It presents information and articles of opinion on educational administration and research.
6. *Education & Psychology Review*—started in January, 1961, is published quarterly by the Faculty of Education and Psychology, M.S. University of Baroda. It is intended to serve as an effective and useful forum of expert opinion and to promote learning and research in Education and Psychology.

SUMMARY

1. Educational research is a relatively new branch of knowledge. Originating in U.K. and U.S.A at about the end of the last century, it is expanding very fast all over the world.
2. Stages through which educational research has come to pass everywhere are those of :
   (*i*) the personal experience method,
   (*ii*) the deliberative approach and finally to
   (*iii*) objective measurement and scientific thinking.
3. Major research organizations functioning at the local and national levels today are universities, government agencies, autonomous public agencies, voluntary professional associations and private concerns.
4. Importance of international cooperation in educational research has been recognized. For organization of research at international level we need:
   (*i*) the sponsorship of an international agency like the UNESCO,
   (*ii*) awareness, on the part of the member states, of the need and value of cooperation in the field,
   (*iii*) facilities for meeting and planning, and
   (*iv*) financial and technical assistance.

5. A brief account of the history and present status of educational research in Great Britain, U.S.A., U.S.S.R., Australia, Canada, France, Italy, Japan and New Zealand, and an enumeration of the major agencies of educational research in these countries, together with a list of the sources of literature on educational research available, are indicative of the growing popularity and rapid advancement of this branch of knowledge.
6. In India the importance of educational research has been recognized rather late. Research in education is more or less a post-independence feature with us.
7. Starting from our Universities, research in education has attracted the attention of State and Central Governments. More and more universities, departments of education and teacher-training institutions are entering into the field and many governmental agencies are doing useful work, Foreign aid and assistance in various forms has been welcome.

QUESTIONS AND PROBLEMS

1. Trace the origin and stages of development of educational research. What place does it occupy today in the world of knowledge as a whole?
2. Why is international cooperation considered essential in the field of educational research? What difficulties stand in its way? How can they be removed?
3. Is it proper to call the Great Britain and the U.S.A. 'pioneer countries' in educational research? Trace their influence on other countries in this field.
4. Not only in the West, but in the East also, educational research has found firm roots. Do you agree? Discuss with examples.
5. Have we in India been really late in recognizing the importance of educational research? From what major pitfalls in education could we have saved our country had we started research in education from the beginning of the present century?
6. What is the position of educational research in our country today? Trace its recent development in India and describe the major agencies functioning and sources of information current in the field.
7. What are the main limitations of educational research in India? What plan would you suggest for its improvement and progress?

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CHAPTER THREE

Problems and Fields of Educational Research

General : Definition and origin of Problems. Fields of educational research—curriculum; text-books and syllabuses, organization; administration; child development; skills; guidance and counselling; educational measurement; equipment and aids; methods of teaching; teacher education; history of education; philosophy of education; psychology of education; socio-economic conditions—a rough demarcation.

In India: Fields of educational research—various orders of priority. Problems of education in India—those already tackled at various levels of research—area wise distribution.

'Problem' may be defined as a question proposed for solution by research. "The problem comes out of a situation in which there is a recognition that something is the matter, that unsolved difficulties exist."[1]

"The unsolved problems of education are so numerous and so varied that it is necessary to simplify a survey of them by using some rather arbitrary classification."[2] We may, for example, classify them under various stages of education—Infant Education, Primary Education, Secondary Education and University Education; or under various kinds of education—General Education, Technical or Vocational Education, Moral Education, Physical Education, etc. It is, however, more pertinent and convenient to classify the problems on the basis of various educational aspects, under such heads as Curriculum, Text Books and Syllabuses, Organization, Administration, Equipment, Methods of Teaching, Socio-Economic Conditions, Teacher Education and the like.

Curriculum

The question of what to teach at various levels of education, to various types of pupils, needs to be answered satisfactorily.

[1] F. L. Whitney, *Elements of Educational Research.* New York: Prentice Hall, Inc., 1954, p. 68.

[2] R.A.C. Oliver, *Research in Education.* London: George Allen & Unwin Ltd., 1946, p. 14.

It is a very important question, for it is not until a decision has been reached as to what is to be taught that we can discuss intelligently the plan of the school building, the kind of equipment necessary, the form of organization, the qualifications of the teacher and the methods to be employed.

We know that the world of matter as well as ideas, to which children have to be introduced, is continually changing and the curriculum must change with it. What we select for teaching must be, therefore, constantly or periodically under review. In India, a few years ago, for example, the same curriculum was prescribed for all types of students. English was a subject which was compulsory for school children from the third class onwards, and Mathematics was compulsory for all students at the High School stage. But the changing needs of society raised doubts as to the suitability of the then existing curriculum. Reform seemed to be necessary, and so some changes were made. But the validity of such changes, as have been introduced on the basis of theory in the primary and secondary school curricula of today, needs to be verified through practical evidence and research. What subject-matter is to be taught—how much and in what form—these are questions which need to be satisfactorily answered and they give rise to innumerable problems of research. The introduction and teaching of foreign languages, mathematics, science, social studies, art and craft, are fields in which considerable research has been undertaken in advanced western countries. In our country deliberations, discussions as well as some research are on the increase and tend to develop steadily. The quest for minimum essentials for the needs of the community and the individuals comes under this field.

Text Book & Syllabuses

Closely allied to the formulation of suitable curricula is the question of prescribing the right type of syllabuses and text books. 'Are the existing syllabuses and text books prescribed in a subject able to achieve the aims of teaching that subject or not ?' is a question an answer to which every searching teacher would like to know before following them. Thus, not only does the suitability of the existing text books and syllabuses need to be verified, but there also seems to be

a need for investigation into the best types of syllabuses and text books. With changes in the aims and methods of teaching a subject, or in the population of students, the text books and syllabuses need to be changed. For example, with the changed status of English in our schools and also because of the changes in its methods of approach as well as in its linguistic analysis, the suitability of its text books and syllabuses should be verified through appropriate research. The justification for rejecting grammar and translation, and for introducing a structural syllabus in the teaching of English has to be established before the change is adopted on a large scale and text books written accordingly. Vocabulary, content, printing and illustration of text-books are important issues needing attention.

Organization

The organization of education presents innumerable problems. Issues such as the age of entrance to school, the most satisfactory size of a class for the teaching of the different subjects, the relative efficiency of collective and individual teaching, the various aspects of examination, promotion and wastage, co-education, comprehensive or multi-purpose schools lend themselves to a good deal of scepticism and therefore, to any amount of research.

Administration

That problems exist in educational administration, calling urgently for consideration, is evident. There are problems both in the financial and the educational side of administration. The problems of finance—the relative contribution to educational expenditure of local and national funds, and the costs of administration, etc.—need to be tackled intelligently. Similarly, the distribution of freedom and responsibility among students, teachers and the Head of a school and the Directorate or Department of Education is a highly controversial subject which has to be solved through appropriate research by various institutions. How far a school can function best under a democratic or bureaucratic set-up needs to be seen through relevant research.

Child Development

Since the central focus of educational research is the development of the pupil, and particularly in so far as this is produced by the practices of the school, it is hardly surprising that developmental studies should constitute a major area of educational research. The physical, mental, moral and personality development of children offers any amount of situations which pose important questions that require satisfactory answers. What are the conditions that lead to or hamper a full and harmonious development of a child's personality? How can schools promote favourable conditions? Are interests and attitudes hereditary or conditioned by environmental influences? How can schools develop among children certain desirable traits, interests and attitudes? What provision is to be made for individual differences among children? What is the best approach to the education of gifted children? How should backward children be educated? How best can we rehabilitate and educate the maladjusted or delinquent children? Such problems usually demand the attention of teachers and educationists today.

Skills

Handwriting, reading and spelling, etc. are skills which have to be developed through proper educational means. The field of Handwriting permits much scope for research in speed, legibility, fluency, in standardizing tests and scales, and in diagnostic work. Similarly, Reading offers scope for research in vocabulary, comprehension, speed, in basal reader and supplementary readers, in interests and habits. In spelling also much worthwhile survey as well as diagnostic and remedial work can be and has been done.

Guidance and Counselling

The need for guidance programmes has been recognized due to a study of individual differences. An equitable distribution of aptitudes, interests and abilities on the one hand and of educational and vocational facilities on the other, needs to be maintained. Guidance services in schools seem necessary for the nation's citizens. The field of educational and vocational guidance, now as it is, poses problems of diagnostic and

prognostic research. For proper guidance to be given to children, adequate tools to diagnose their abilities and aptitudes need to be prepared and their values and limitations tested. The construction of proper attitude scales, personality inventories and intelligence tests offers the possibility of worthwhile research in our country.

Educational Measurement

Every teacher and educator is concerned with certain educational outcomes in the form of the acquisition of certain attitudes, behaviours and skills. How much a student has gained in these respects during a particular period of time, has to be ascertained periodically and in a systematic way. We need valid and reliable tools for measuring such educational outcomes. Are essay type examinations valid and reliable? If not, what are their shortcomings? How can they be removed? What alternative types of tests would be more appropriate for the purpose? What are the techniques of constructing such tests and how are they to be used? Hence, the critical evaluation of existing forms of tests, the construction and standardization of more valid and reliable instruments for measuring the educational outcomes of teaching specific subjects and of various educational activities are fields for significant research.

Educational Equipment & Aids

The designing and engineering of equipment for schools is a relatively new, but important field of research and development. The designing of proper buildings, chairs, desks, tables, lockers, toilets and other school furnishing is not devoid of difficulties. The new mechanical devices that may facilitate learning—their construction, utilization and evaluation—offer sufficient scope for research. The effectiveness of mass-media like the cinema and wireless, and of excursions and other audio-visual aids, should be ascertained before they are made popular. The value of illustrations, charts and diagrams, in teaching a subject could be experimentally measured.

Methods of Teaching

There always are some old, some current and popular, and certain new or original methods of teaching a subject.

"Methods are legion and most of them could be tested by experimental investigation."[3] Constructive experiment on and evaluation and criticism of a particular method of teaching or the comparative and critical evaluation of any two or more methods of teaching the same subject are necessary for improvement in class teaching. For example, the effectiveness of the structural approach to the teaching of a foreign language like English, can be compared, through experiment, with that of the traditional grammar-translation approach: or, the effectiveness of the discussion method of teaching a topic can be compared with that of the lecture method.

Teacher Education

A comparatively new but productive field of education—teacher-education, is open to many kinds of research—research into the goals of teacher-education, the ways of reaching those goals in terms of curriculum, syllabus and activities, into the methods and sources of educating teachers and the relative merits of the one or two year professional training after general education, and the concurrent general and teacher-education courses. Sufficient research has been undertaken, in the west, in relation to the analysis of the personality pattern of successful teachers and its relation to teacher-education courses.

History of Education

The value of a study of the history of different aspects of education, in so far as the planning of future education goes, is great. Any aspect or kind of education lends itself to historical research. For example, we may trace the beginnings and development of Basic Education in our country, or study historically the development of nursery, primary, secondary, university, or teacher education. Similarly we may carry on historical research in the teaching of English in our country or in the use of certain audio-visual aids in teaching, etc. etc.

Philosophy of Education

There are theories of education—old and new, past and present, popular and otherwise—which are subjects of endless controversy and discussion. Every aspect of education, every type of education, every method of teaching, has some theory

[3] R.A.C. Oliver, *ibid* p. 33.

or the other as its basis. The soundness of the theoretical bases of education, past or present, must be examined in order that future plans of education may produce sound results. An objective examination of the suitability of educational theories to the prevalent circumstances and conditions at a place would be always highly significant and fruitful.

Psychology of Education

Conditions conducive to learning, factors promoting memory or producing worthwhile responses, measures facilitating reading and writing and the like, are subjects with which a psychologist is as much concerned as a teacher. Eminent psychologists seemed to have solved some problems in these and allied fields in their laboratories. Teachers are, however, still confronted by situations which do not always get solved by the psychologists' solutions. Why is it so? How else can they be solved? Can there be more than one solution to them? Why? These and such other problems can always be picked up by an educational research worker.

Socio-Economic Conditions

These constitute no less important a field of inquiry as they do influence educational processes and outcomes substantially. Socio-economic factors do have their impact on the educational philosophy of a school system and the population of a school, and offer various subjects for research. Such research may be of local value only, but it can still be of great practical significance.

Comparative Education

Different geographical, cultural, socio-economic and political conditions surely influence educational systems of different countries. The comparison of the educational systems of various countries lends itself to a variety of methods of treatment all of which have to be objective and scientific to be of any worth. The emphasis may at times be on the historical development of institutions and practices of education in different countries; at others, on socio-economic or geographical or cultural forces moulding them; and at still others, on the levels of achievement reached or aimed at.

"The areas of research," says Travers, "may be likened to areas on a map that have been roughly circumscribed to indi-

cate gross differences in terrain. Some penetration has perhaps been made within the border of these areas, but most of them remained unexplored. Explorers of the future, will provide broad knowledge of those general areas, and then must come the developers who will exploit the resources that each domain has to offer. The boundaries which have been set up are artificial, for each one of the areas of the educational research fuses into the other"[4]

PROBLEMS AND FIELDS OF EDUCATIONAL RESEARCH IN INDIA

The students, teachers, supervisors, educationists and even laymen in India are faced with innumerable problems, *i.e.* 'unsolved difficulties', in almost all the fields of education referred to above. We have come to recognize the urgent need for research as the best means to solve such problems. But while the problems are numberless, our personnel and resources to tackle them scientifically are extremely limited. Naturally when planning for research, we have to arrange the problems in order of priority. Because of different view points and varied ideas about education, no order of priority given to the study these problems can be 'the order of priority'. Different educationists in the country may draw their own orders of priority. For an example, we quote below *the order of priority given to educational problems for research in India,* by Prof. P.S. Naidu in 1950.[5]

1. The Philosophical Problem—Aim of Indian National Education.
2. (*i*) The Sociological Problem.
   (*ii*) Educational Surveys.
3. The Psychological Problems.
4. The Technological Probems.

One may or may not agree with this order of priority, but few will disagree with the necessity for research in the above fields. Various educationists have, however, mentioned even the fields in which problems exist, differently. We may benefit by taking a glance at some.

[4] Robert M.W. Travers, *op. cit.*, p. 67.
[5] P.S. Naidu, *op. cit.*, pp. 2-3.

According to Principal Lahiri, the main fields in which educational research is needed are[6] :

(1) Psychology in the Classroom.
(2) Empirical Child Study.
(3) Secondary School Curriculum.
(4) Examination System.
(5) History of Education.
(6) Philosophy of Education.
(7) Educational Administration and Organization.
(8) Moral Education.
(9) Methods of Teaching.

The areas of education to be undertaken for research indicated by *the Sub-committee in the Seminar on Promotion of Research in Training Colleges* were :

1. Experimental Work in Curriculum Construction.
2. Organization and Administration.
3. Teaching Personnel (*e.g.* the teaching load).
4. Improvement of Instructional Techniques and Methods.
5. Psychology of the Indian Child (*e.g.* backward, gifted, and delinquent).
6. Testing and Guidance.
7. Educational Sociology.

V.V. Kamat, in his article on 'Can a Teacher do Research ?' published in *Teaching*, Vol. XXX, No. 1, September 1957, listed some educational problems for research in India, already tackled, or worth tackling.

They are :

1. Vocabulary of children of various age groups in different mother-tongues.
2. The public schools of India.
3. Errors committed in learning languages.
4. Voluntary activities of boys and girls of various age groups.
5. Heights, weights and other physical indices of boys and girls of various age groups.
6. Self-government in schools.
7. Methods of Teaching Geography and History.

[6] J. Lahiri, "Researches and Experiments in Education in India," *Educational India*, Vol. XXV, No. 5, November 1957.

8. Reading Interests of boys and girls.
9. Education of superior children.
10. Education of backward children.
11. Administrative practices.
12. Group methods of teaching in primary schools.
13. L. E. A's. in the State of Bombay.
14. Educational contribution of various educationists in India.
15. Hobbies of boys in various age-groups in secondary schools.
16. Hobbies of girls in various age-groups in secondary schools.
17. Voluntary schools in primary education.
18. Educational qualifications of primary school teachers.
19. Differential attainment of children of urban and rural areas.
20. Comparison of attainments of children who have attended nursery schools and those who have not.

At the Sixth Conference of the All-India Association of Training Colleges held at Bangalore in June, 1961, Prof. M. Verma said :

> Stress should be laid on the development of basic tools and to direct research activity towards the solution of problems which have a fundamental and functional importance in education.

At the same conference a list of problems was suggested for research in the following areas of education[7] :

1. Educational and Developmental Psychology.
2. Indian Philosophy.
3. Educational Administration.
4. Educational Evaluation and Measurement.
5. Educational and Vocational Guidance.
6. Methodology of Teaching Various School Subjects.
7. Syllabus, Text-books and Teacher-training.

DISTRIBUTION OF THE AMOUNT OF RESEARCH DONE IN VARIOUS FIELDS OF EDUCATION IN INDIA BETWEEN 1950-1960

So far we have no complete authoritative bibliographical data available on the problems of education studied at various levels.

[7] See Appendix F for the list of problems.

The Union Ministry of Education is, no doubt, engaged in collecting the subjects of dissertations and theses prepared by students and scholars in the field of education all over the country under the sponsorship of various and varied institutions. But, for the students of educational research not much information is easily available as yet. For giving the students of educational research an idea of the distribution of research done in the various fields of education in India between 1950 and 1960, the authors started on a bibliographical survey in this field and requested the various colleges, institutions and departments of education to supply them with a list of topics on which research has been completed by their students and members of staff. The response, though not cent per cent, was quite encouraging. It forms the main raw material for the field-wise analysis of research topics given below. Additional data was derived from a survey of some educational periodicals and publications reporting on scientific studies in education carried on during the last decade. In all, 775 research topics were thus made available, of which about 85% represent Masters' and Doctors' theses and the rest 15% periodical references. An analysis of these is tabulated on page 51.

It is evident from the analysis presented in Table I that the most popular field for research in education with Indian researchers during the last decade has been the field of Educational Psychology. Within this field various important aspects of the psychology of students of our country which have a bearing on different aspects of education have been studied. The 190 topics of research classified under the field of Educational Psychology may be distributed into various categories on the basis of the areas they belong to—Personality, Attitudes, Failure, Backwardness, and Diagnosis, Interests, Behaviour Problems, Maladjustment and Delinquency, Social Psychology, Learning-Factors and Influences, Habits, Behaviour Adjustment, Handicapped, Intelligence, etc. Obviously, and naturally enough, these areas are overlapping and should not be taken as exclusive or independent categories. The labelling of a particular topic under any area is arbitrary, based more or less on commonsense. Table II presents an analysis of these topics areawise.

TABLE I

FIELD-WISE CLASSIFICATION OF THE 775 TOPICS OF RESEARCH IN EDUCATION COMPLETED DURING 1950-60

Field	Number of Dissertations.	Number of periodical reports.	Total No.	Per Cent.
Educational Psychology	150	40	190	24.52
Measurement in Education	85	15	100	12.90
Administration and organization	80	9	89	11.48
Teacher-education	39	4	43	5.55
Educational and Vocational Guidance	31	3	34	4.39
Child Development	28	4	32	4.13
Curriculum	25	4	29	3.74
Socio-economic Background	25	3	28	3.61
Methods of Teaching	25	1	26	3.35
History of Education	19	2	21	2.71
Text-books	18	...	18	2.32
Skills	14	1	15	1.83
Philosophy of Education	12	2	14	1.81
Aids and Equipment	12	...	12	1.55
Moral Education	5	3	8	1.03
Syllabus	7	...	7	0.93
Comparative Education	2	...	2	0.26
Other Miscellaneous fields*	62	6	68	8.77
Special subjects†	33	6	39	5.03
Totals	672	103	775	99.91

* These include such topics in the fields of nursery, primary, basic, rural, women's, technical and adult education, extra-curricular activities, bibliographical and legal research as could not be classified under any of the main fields listed above.

† These include such topics in the field of special subjects—Art and Craft Civics, Mathematics, Marathi, English, Geography, Hindi, History Home Science, Music, Poetry, Sanskrit, Social Studies, and Science—that is, those that could not be classified under any of the main fields listed above.

TABLE II

AREAWISE ANALYSIS OF THE 190 TOPICS OF RESEARCH IN PSYCHOLOGY OF EDUCATION

Area	Number of Topics	Per Cent
Personality	27	14.21
Attitudes	27	14.21
Failure, Backwardness and Diagnosis	27	14.21
Interests	22	11.58
Behaviour Problems, Maladjustment & Delinquency	20	11.53
Social Psychology	14	7.37
Abilities and Aptitudes	11	5.79
Learning-Factors and Influences	10	5.26
Habits	8	4.21
Behaviour and Adjustment	7	3.68
Handicapped	5	2.63
Intelligence	5	2.63
Miscellaneous	7	3.68
Total	190	99.99

It is interesting to note that within the field of educational psychology, the areas of personality, attitudes and educational diagnosis have been equally popular. Studies of children's interests and behaviour problems fall next in frequency. The frequency of studies in the area of intelligence and-learning have not been so limited as it appears from the present classification. The number of topics concerned with learning and intelligence has in fact been much larger than this table indicates; but those topics have found a more suitable place under other categories, *e.g.*, educational measurement, vocational guidance, child development, or methods of teaching, than psychology of education. Some important topics studied in educational psychology will be listed for reference in Appendices D and E.

The next significant field of educational research, as judged by the frequency of problems tackled from it, is the field of

educational measurement. The concept of measurement and evaluation has changed so much during the last few years that we need not be surprised at the popularity of subjects under this head. The need for construction of suitable achievement test in various subjects for various grades has been universally recognized and widely responded to. Finding out relationship between general or specific achievement and intelligence, attitude or interest, etc. and finding out relationship between achievement in different sujects has also been quite frequently attempted. A list of some topics of research tackled under measurement in education will also be listed in Appendices D and E.

Educational administration and organization fall next in frequency. This category includes various problems related to the administrative set-up of different kinds of schools. It includes other problems related to the provision and organization of libraries, recreational facilities, extra-curricular activities, student bodies, physical education and the like. Some representative problems from this category will also be listed for reference.

Problems studied under teacher-education are next in frequency. This branch of educational problems is as varied as any other. Problems undertaken are those of a psychological nature wherein the attitude of teacher-trainees, or of the candidates for teacher-training, towards the profession is measured, or wherein problems of the adjustment of teacher-trainees to their course of studies or to their educational set-up are located, or when the relationship between teacher-trainees and the students is studied. The problems are of the nature of survey when investigations are made into the current programmes and problems of preparing teachers for particular subjects or special kinds of schools or children. Problems are of an immediately practical nature when subjects like procedures of selection for teacher-training, or difficulties of teacher-trainees in their class-room teaching, or provision for in-service teacher education are undertaken for study. Teacher education is quite often studied from a historical, comparative and critical angle too. Techniques of educational measurement are also applied, in constructing and validating predictive tools, in this branch of education. Some problems tackled in teacher-

education will be available for reference in Appendices D and E.

Educational and vocational guidance, new as the field is, has received considerable attention. The needs of educational-vocational guidance at the different levels of education and the provisions of guidance and counselling in various places or stages are quite frequent areas of study. But even more frequent than these are areas of investigation into the educational or vocational interests and preferences of pupils at different places, in different grades, or from different socio-economic backgrounds. Studies of occupational needs and trends are sometimes made under this head, as also those related to the construction of instruments for measuring aptitude and ability for predicting an individual's success or otherwise in a particular course of study or profession.

Studies in child development, almost as frequent as those in educational and vocational guidance, represent various aspects of child development. Problems related to the physical development of children, the various aspects of their mental and social development, the interest and activities of children of various age-groups, the different influences on the development of the child's personality are studied under this category.

Curriculum studies, studies of socio-economic factors influencing educational phenomena and investigations into methods of teaching various subjects occupy almost the next place in order of frequency. Studies attempted in the area of curriculum are either of a theoretical, a critical or a constructive nature, or else of the survey or historical type. The influences of socio-economic background of children on their intelligence, attitudes, interests, or scholastic achievement and on their vocational preferences, etc. are frequently assessed. The socio-economic studies also represent investigations into the home-background of different types of children, the socio-economic set-up conditioning different systems of education and the educational needs of children belonging to different socio-economic levels. From the field of methods of teaching, have been studied problems related to methods of teaching various subjects—English, Mathematics, History and Social Studies, etc.—

through a theoretical, a historical, a survey or an experimental approach. Some examples of topics under all the three fields discussed above will be included in the list of topics in Appendices D and E.

From the frequency of problems attacked in other fields one can see that more or less theoretical areas of philosophy and history of education have attracted comparatively more investigators than the more practical problems of text-books, syllabuses, educational aids and equipment and of development of skills. Although the problems of history and philosophy of education are important and fundamental yet the problems from other areas, when properly tackled, can lend to more immediate and practical use. For brief, short-term investigations, as required from the M. Ed. students, problems of the action-research type are more suitable and worthwhile. From the field of comparative and moral education, the problems selected have fortunately been of considerable practical significance.

Under the two categories – *other fields* and *special subjects*— are included miscellaneous educational studies and investigations which could not conveniently and justly be categorized under any of the special fields mentioned above. General surveys of education at different levels—nursery, elementary, secondary or university; of different types—basic, technical, women's, rural or adult; in different geographical areas; or a couple of legal and bibliographical researches are represented under *other fields*. Under *special subjects* are included studies related to a general survey of teaching various subjects— English, Geography, Science, Mathematics, Sanskrit, Art and Craft, Hindi, History, Home Science, Languages, Music, Poetry, Marathi and Social Studies, etc.—in various places. The topics suggest investigations of such a general nature that they seem to go under none of the fields like psychology, history or philosophy of education, methods of teaching, organization and administration of education, curriculum, syllabus or text-books, or aids and equipment, etc. How worthwhile such studies can prove to be will depend on what depth or breadth has been reached and what definite need and purpose the findings can fulfil. Even under vague and wide

topics many worthwhile studies are sometimes available.

Appendices D and E of this book give a fairly representative list of problems studied during the last decade in India at various levels, a frequency analysis of which has formed the subject of the above discussion and of the Tables No. I and II.

Any number of important problems which have received or which still need the attention of Indian research workers can be listed. Many a problem have been tackled, many more remain to be solved. In this connection let us conclude by quoting Dr. Sita Ram Jayaswal's valuable advice with regard to the 'multidimensional nature' of our problems :

> We cannot reform our educational system by patch-work, for problems in education are a part of the problems facing our society today. Our educational problems need a sociological approach, a psychological understanding, and above all, a scientific attitude. We cannot afford to be guided by personal whims and prejudices, opinions of an individual however high or mighty he may be. The time has come for us to apply scientific method in education. In other words, we need scientific research in education. Let us find out by means of research, for example, the cause and cure of indiscipline. There are numerous problems in education which need investigation on a large scale. It would be a good idea to have a Bureau of Educational Research where problems in education are investigated and scientifically ascertained . . . . The departments of education in the Universities can also be very helpful in this matter . . . . There is so much to be done. Problems in education are numerous and challenging. Let us face them with courage, patience and strength.[8]

SUMMARY

1. Questions or 'unsolved difficulties' proposed for solution by research are 'problems'.
2. Problems for research in education are innumerable and can be variously classified. The most pertinent classification of the fields from which educational problems emerge is that which classifies problems under such heads as curriculum, text-books and syllabuses, organization, child development, skills, guidance and counselling, educational measurement, equipment, methods of teaching, teacher-education, history

[8] Sita Ram Jayaswal, "Problems in Education—Need for Research", *Shiksha*, Vol. VIII, No. 1, July 1955, pp. 102-3.

of education, philosophy of education, socio-economic conditions and comparative education, etc. Each of these fields offers any number of worthwhile problems for research some of which have been solved while others are awaiting solution through proper research. The demarcation between these fields, however, is arbitrary and rough.

3. It is difficult to say which of the fields of education is most important, or from which of the various fields problems should receive a priority of treatment. In India, different educationists have drawn their own orders of priority according to their own ideas about education and about the educational needs of our country.
4. No authoritative complete bibliographical source is available to us in the field of educational research undertaken in our country so far. A modest bibliographical survey has been made by the authors in this field and the distribution of research undertaken in various fields of education during 1950-60 in India at various levels has been analysed. The analysis shows that the descending orders of frequency of the fieldwise distribution of problems is :

   Educational Psychology
   Administration and Organization
   Teacher-education
   Educational and Vocational Guidance
   Child Development
   Curriculum
   Socio-Economic Background
   Methods of Teaching
   History of Education
   Text Books
   Skills
   Philosophy of Education
   Aids and Equipment
   Moral Education
   Syllabus
   Comparative Education

5. Areawise analysis of the topics studied in Educational Psycholgy shows that personality, attitudes and diagnosis are the most popular areas from which problems have been

taken up. Interests and problems of backwardness and delinquency have also received due attention. Many other aspects of the psychology of children have been studied.

6. Analysis of other fields of research brings out the fact that under each field various types of problems have been tackled. It is felt that although a majority of these problems are of practical significance, yet quite a considerable amount of effort seems to have been devoted to bookish or theoretical problems. It is suggested that more emphasis be laid on action-research, dealing with actual classroom problems of immediate concern.
7. Appendix D gives a list of representative topics, from various fields, on which research has been completed for the M.Ed. or Ph.D. Degrees of various Universities in India.
8. Appendix E gives a list of representative topics, from various educational fields on which research has been undertaken and reported in various publications during 1950-60 in India, indicating the authors and sources of such research reports.
9. Though a large number of problems has been studied in India, a much larger number remains to be solved. A modest attitude, but a daring one, is needed for handling the situation.

QUESTIONS AND PROBLEMS

1. What do the terms 'problems' and 'fields' of educational research connote? What classifications of 'fields' of educational research do you consider most desirable? Why?
2. Make a list of the pressing educational needs in our country that research must meet with a satisfactory solution. Name these needs in the order of their importance.
3. Make a list of research contributions in any one significant field of educational research in India. Fully illustrate your answer with examples.
4. What trends of educational research do you find current in India during the last decade? What improvements would you like to introduce in this field?

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CHAPTER FOUR

Procedure in Educational Research—A Selection, Formulation and Definition of the Problem

Various steps in procedure – selection, formulation and definition of the problem – actual attack of the problem – reporting on the study. Selection of the problem – need, sources, points to consider. Formulation of title and statement ; common errors in phrasing titles ; different ways of stating problems. Definition of the problem – meaning, need and constituent parts. Pilot study.

Problems in the field of education all over the world are numerous. A scientific study and successful solution of these problems is no easy task. For the study and solution of every single problem in education the research workers, whether working individually, or in groups, have to undertake many steps in a well-regulated order. Failing in any one of the steps may amount to a critical lapse in the whole attempt and end in unsatisfactory results. To analyse the procedure in educational research we may do well in outlining below the various steps thus:

1. Selection and Formulation of the Problem.
2. Definition of the Problem.
3. Actual Attack of the Problem:
   - (*i*) Collection of what is 'known'—the available related information.
   - (*ii*) Collection of what is 'unknown'—sufficient new, relevant data.
   - (*iii*) Organization of data—old and new—to secure sequence, progress and meaning.
   - (*iv*) Formulation of conclusion on the basis of the findings, and the emergence of a thesis on the subject.
4. Reporting on the study undertaken.

Let us discuss, in the present chapter, only the first two of the above steps, and then in the subsequent chapters, the sub-steps of the third. We shall postpone the discussion of the last step for some time and get acquainted with some other

important things in the meantime.

SELECTION OF THE PROBLEM

When the range of phenomena that the researcher may study is contemplated it is realised that he should approach his task with considerable humility. Out of a group of recognised problems a choice has to be made so that they may be tackled one at a time. One problem may be selected rather than the other, (1) because of its interest, (2) as a basis of further study, (3) to improve educational conditions, or (4) to further personal ambitions.[1] But it is absolutely essential that a potential educational research worker be aware of the whole picture of educational research—completed, under progress, and needed. *Problem-awareness* is not ordinarily a characteristic of the beginner. In order to discover these problems he has to get acquainted with the field through an approach to varied sources in the form of books, courses, periodicals, proceedings of learned societies, lists of theses, historical analyses, reports of conferences, survey of scientific studies of all kinds, and so on.

Where to look for Problems of Research ?

In answer to this question we may say :

1. *In the conflicts experienced* by one who is being educated or who is performing some type of educational work. Incongruities, contradictions, points of controversy and untested conclusions in any area of education can be made a subject for research.

2. *Among the suggestions for needed research* made by educators, educationists and research workers. By following clues obtained from reading and contemplating about such suggestions one can always discover worthwhile topics for research. Assignments in text books, special assignments, reports and papers may easily suggest areas of needed research. Besides, there are the specialized sources as the *Encyclopaedia of Educational Research, Psychological Abstract, The Review of Educational Research, The Journal of Experimental Education, the Journal of Educational Research, The Doctors' and Masters' Theses in Education,*

[1] J.C. Almack, *Research and Thesis Writing.* London : Houghton Miffin Co., 1930.

Dissertation Abstracts. Sources of this nature are good for problem-seekers.

3. *In research work already completed.* To an intelligent mind, lists of thesis already completed may suggest other problems in the same, related, or so far neglected areas.

4. *Gaps or deficiencies in explanations,* 'areas of darkness', so to say, may suggest supplementary problems to fill in those blanks.

5. *Past theories* which seem to need re-examination because of the rise of certain doubts as to their soundness.

6. *The classroom, school or community* which is always a logical source for educational problems with which a teacher is confronted everyday. Classroom lectures, class discussions, seminar reports and out-of-class exchanges of ideas with students and professors may suggest many stimulating problems.

7. *Technological changes and social developments* bringing forth new problems and new opportunities for research.

8. *Consultation with the course instructor or adviser.* Although research problems are not assigned, yet consultation with the more experienced staff members is a desirable practice, for it helps a student in clarifying his thinking, in achieving a sense of focus and in developing a manageable problem from one that may be vague and complex otherwise.

Finding a problem for research, however, does not mean that it should become the problem of research. One may still have to reject it if one uses his discretion and foresight. Before the proposed research problem can be considered appropriate, several searching questions should be raised.

Questions one needs to ask when selecting a problem for atttack

1. *Is is interesting*? For, if it seems dull and boring to the research worker, there is little hope that he would do justice to it.

2. *Is it new*? For, if it has been already tackled by some previous researcher, then the duplication of effort would be a sheer waste.

3. *Is it significant*? For, if it is not worthwhile, if it neither adds to knowledge nor leads to any improvement in the current practices, it would be in vain.

4. *Is it feasible*? For, a problem may be interesting, significant and new and yet not be a good problem for a particular research worker and he may fail to carry it through to a successful conclusion. One must ask, therefore :

(*a*) Do I possess the necessary competence to plan and carry out a study of the type this problem warrants? Have I got enough knowledge about the field and sufficient skill to manipulate the required tools and techniques for gathering and interpreting the data?

(*b*) Are pertinent data accessible? Are valid and reliable data-gathering devices and procedures available?

(*c*) Will I be able to get proper guidance from a Staff or a Faculty member in planning and completing the task ? If any sponsorship, cooperation and special permission is required in its execution, will it be available?

(*d*) Do I have the necessary financial resources to carry on the study?

(*e*) Do I have enough time to execute the project from beginning to end?

(*f*) Do I have the courage and determination to pursue the study inspite of some difficulties and social hazards that may be involved in it ? Special risks, penalities and handicaps or costs of a physical, financial, personal, social or professional character may arise any time. Will I be able to face them boldly?

It is only when the above questions are answered in the affirmative, that the problem can be considered a good one.[2]

FORMULATION OF THE PROBLEM

Once the selected problem for research has been evaluated and finally adopted for investigation the next step is to phrase the topic adequately and state it clearly.

TITLE AND STATEMENT

Statement of the problem is not exactly the same as the title of the thesis. "As a rule, the title of a thesis can do no more

[2] Cf. "No educational research project should be undertaken unless its consequences give promise of improving significantly an important educational practice or operation"—Stephen M. Corey, "Some Thought About Educational Research—I," *Education and Psychology Review*, Vol. I, No. 1. January 1961, pp. 5-8.

than name the topic or the particular field represented."[3] A statement of the problem in one or two paragraphs, has a definite place in the introductory chapter and is an attempt to focus on a clear goal.

TITLE

Common errors in phrasing of topics which should be avoided are :

(1) Naming a broad field or area of study instead of a specific problem. *e.g.*, 'The Teaching of English in India.'

(2) Narrowing or localizing a topic to such an extent that it indicates a pinpoint problem, too small and insignificant for research purposes, *e.g.*, 'A proposed history of a small village school.'

(3) Including terms of an unscientific, rhetorical, argumentative, emotional or biased nature, *e.g.*, Teaching as a great adventure and a life service', or, 'An attempt to show pupil activity vs. teacher domination,' or, 'An essay on equalization of educational opportunity based on the view that the wealth of the state should educate the future citizen.'

Thus, an adequate title for a research thesis is one which represents a reasonable restriction and implies an objective approach, *e.g.* :

(*i*) An analysis of Different Methods used in the Prediction of General University Achievement.

(*ii*) A study of the causes and symptoms of backwardness in children in the secondary schools.

(*iii*) An investigation into the history and development of school broadcasts in India.

(*iv*) A critical and comparative study of post-graduate teacher-education in England and India.

(*v*) An evaluation of Basic Education as it exists in practice today.

STATEMENT

Different ways of stating the problem are:

(1) Posing a question:

[3] Carter. V. Good & D.E. Scates, *Methods of Research*. New York: Appleton Century Crofts, Inc., 1954, p. 74.

(*i*) a single question,
(*ii*) several questions, or
(*iii*) a single question followed by several sub-questions.

(2) Making a declarative statement :
(*i*) a single declarative statement,
(*ii*) a single statement with several phrases,
(*iii*) a series of complete statements,
(*iv*) a general statement followed by subordinate statements,
(*v*) a statement followed by restatement in the form of a question,
(*vi*) a statement followed by a series of theses.

Which way to adopt?

One may choose any of these ways remembering that the question form has an advantage in sharpening and focusing the issue, but the declarative statement is perhaps more common, and both the ways may be combined easily in an initial statement of the problem.

DEFINITION OF THE PROBLEM

The relatively brief introductory or initial statement of the problem is to be followed by a fuller definition[4] and description of the proposed thesis. This is what is usually termed as the outline, the synopsis, the proposal or the 'agendum'[5] of the proposed research project. Almost all institutions and courses demand that a carefully organized outline plan for a research project, be submitted before any project is approved, because:

(1) this provides a basis for evaluation of the proposed project ;
(2) this gives the advisor a basis for guidance and help later ; and
(3) this provides a systematic plan of procedure for the researcher to follow, insuring a steady and continuous progress, without false starts or retrogression, toward the goal set-up.

[4] "To define a problem means to specify it in detail and with precision"—W.S. Monroe and D. Engelhart, quoted by F.L. Whitney, *op. cit.*, p. 109.

[5] J. W. Best, *op. cit.*, p. 22.

The 'agendum' is comparable to "the blueprint which the architect prepares before the bids are let and building commences".[6] Its essential parts are :

1. *Statement of the problem or its analysis into its constituent elements.* Question or questions that the research is designed to answer are usually framed as *hypothesis or hypotheses* to be tested on the basis of evidence. It may be appropriate to formulate one or more hypotheses at this stage and suggest possible conclusions. Such a step clearly establishes the nature of the problem and the logic underlying the investigation, and gives direction to the data-gathering procedure. "A hypothesis is a shrewd guess or inference that is formulated and provisionally adopted to explain observed facts or conditions and to guide in further investigation."[7] A good hypothesis should be—

(*i*) reasonable, *i.e.* logically consistent,
(*ii*) consistent with known or observed facts,
(*iii*) stated in such a way that it could be tested as true or false, and
(*iv*) stated in as simple and unambiguous terms as possible.

2. *The significance or justification of the problem.* It is important to know how the results of the research can influence educational theory or practice, to justify its worthwhileness and give it an urgency. This step would safeguard a wastage of research effort on trivial or superficial investigation.

3. *Statement of scope.* A statement of the limits or scope of the investigation will provide information concerning, *who, what, where, and how many.* "To define a problem means to put a fence around it to separate it by careful distinctions from like questions, found in related situations of need."[8]

4. *A 'resume' or survey of related literature.* A survey of related literature is a very important step not only in finding a problem, but also in the formulation of hypothesis, in the selection of methods and tools to be employed, and in the interpretation of results. A brief analysis of previous studies or related studies found in journals, magazines, articles, and

[6] J. W. Best, *loc. cit.*
[7] Carter V. Good & D. E. Scates, *op. cit.*, p. 90.
[8] F.L. Whitney, *op. cit.*, p. 80.

reports should be made. This provides evidence that the researcher is familiar with what is already known and what is unknown and unproved. Thus, it helps in avoiding duplication and provides helpful suggestions for future investigation.

5. *An analysis of proposed research procedures—sources, data and methods.* This identifies the entire research plan by describing what must be done, how it will be done, what data will be needed, what data-gathering devices will be employed and evaluated with regard to their validity and reliability and how sources of data will be selected, data analysed and conclusions reached.

6. *Definitions of technical terms.* It is important to define all unusual terms that could be misinterpreted. This would help to establish a frame of reference with which the researcher approaches the problem.

7. *Basic assumptions.* In every area of research the whole investigation is based on certain initial assumptions, *e.g.* in studies of the sociological or educational type, the kind of assumptions generally accepted, without any identification in the report, are that school and education are necessary, that man is social by nature, that respect for individual rather than rigid regimentation is desirable as a way of life and education. Such other assumptions should be stated as part of the definition and development of the problem, and also in connection with the conclusions of the investigation. To the extent the basic assumptions are open to question, the results of a particular investigation are subject to challenge.

8. *Limitations.* A recognition of the limitations of the study helps to focus attention on valid objectives and helps to minimize the danger of over-generalization.

9. *A time schedule.* It should be prepared so that the researcher may budget his time and energy effectively. Dividing the project into parts and assigning dates for completing each part helps to systematize the project and minimize the general tendency to procrastinate.

A single study may not include all aspects of definition listed above, but they certainly are important factors to consider in any plan of research. The planning stage of research is the critical stage and should not be hurried. Some-

times it may be necessary to carry out a *preliminary* or *pilot study* in order to determine whether the proposed study is feasible or not. Such pilot studies often indicate that a problem needs restatement or modification before it is considered researchable, and leads to a revision of the previous research plan.

SUMMARY

1. Of the various steps involved in a systematic research procedure the initial steps of selecting, formulating and defining the problem are very important.
2. Selection of an adequate problem is necessary and can be made from a number of problems that suggest themselves through various channels : in the conflicts in experience, among suggestions for needed research, in research, already completed, in gaps or deficiencies in explanations, in past theories, new developments, or from the classroom, school or community.
3. One should be careful to select only that problem which he feels is interesting, new, significant and feasible from various angles—academic, financial, concerning time, etc.
4. In formulating the problem selected, one should distinguish between the title and the statement of the problem. He should phrase his topic to form the title of his study in a way that it is neither too broad nor too narrow, nor of an unscientific, emotional character. It should be brief but clear and exact.
5. Statement of problem finds a definite place in the introductory chapter of the thesis. The statement may take various forms—that of posing a question or making a declarative statement—or those which combine these two main forms in various ways. The most suitable form for the topic in hand should be selected.
6. Definition of the problem implies an 'outline', 'synopsis', 'proposal' or 'agendum' of the proposed research project. Its usual constitutents are :

   (*i*) statement of the problem with hypothesis formulation,
   (*ii*) significance of the problem,
   (*iii*) statement of the scope,

(*iv*) a survey of related literature,
(*v*) an analysis of the proposed research procedure as to sources, data and methods,
(*vi*) definition of technical terms,
(*vii*) basic assumptions,
(*viii*) limitations, and
(*ix*) a time schedule.

All these aspects may or may not be included in a definition, but they are all significant.

7. A pilot study to finalize a research problem and the plan of attack may be essential.

QUESTIONS AND PROBLEMS

1. Although unsolved problems in education are innumerable, but it is no easy task to find out a suitable problem for research. Do you agree ? What difficulties may one come across in selecting a suitable problem for research? Discuss.
2. Many enthusiastic candidates are 'problem blind'. How would you help such a person in discovering existing problems and in selecting a suitable one for himself to study?
3. "No educational research project should be undertaken unless its consequences give promise of improving significantly an important educational practice or operation." (Stephen M. Corey). Discuss. What other factors would you keep in view while selecting a problem for research?
4. How would you distinguish between the title and the statement of a problem ? Select any five significant problems for research. Phrase suitable titles and formulate clear statements for them.
5. What do you understand by the 'definition of a problem' for research? Why is it necessary to define a problem ? Define a problem for research you would like to take up.

SELECTED REFERENCES

Almack, J.C., *Research and Thesis Writing*. London : Houghton Miffin Co., 1930.

Best, John W, *Research in Education*, U.S.A. : Prentice-Hall, Inc., Englewood Cliffs, 1959. 320 pp. Read Chap. II, pp. 15-30.

Cole, Arthur H., Karl W. Bigelow, *A Mannual of Thesis Writing*, New York : John Wiley and Sons, Inc., 1951. 51 pp. Read pp. 2-4.

Corey, Stephen M., "Some Thoughts About Educational Research—I", *Education & Psychology Review*, Vol. I, No. 1, Jan. 1961, pp. 5-8.

Good, Carter V., A. S. Barr and Douglas E. Scales, *Methodology of Educational Research*. New York : Appleton Century Crofts, Inc. 1941. 890 pp. Read Chapts. II & IV, pp. 31-103 and 185-204.

Good, Carter V., *Introduction to Educational Research.* U.S.A. : Appleton Century Crofts, Inc. 1959. 424 pp. Read Chap. 2, pp. 40-80.

Good, Carter V., Douglas E. Scates, *Methods of Research,* New York : Appleton Century Crofts, Inc., 1954, 920 pp. Read Chap. 2., pp. 33-101.

Oliver, R.A.C, *Research in Education.* London : George Allen and Unwin Ltd., 1946. 60 pp. Read Chap. II, pp. 14-40.

Smith, Henry Lester, *Educational Research; Principles and Practices.* Bloomington : Educational Publications, 1944. 249 pp. Read Chap. V, pp. 81-91.

Travers, Robert M.W., An *Introduction to Educational Research.* New York : Macmillan and Co., Ltd., 1958. 466 pp. Read Chap. 4, pp. 69-96.

Whitney, F.L. *The Elements of Research,* New York : Prentice Hall, Inc., 1956. 539 pp. Read Chaps. III & IV, pp. 68-95 and 109-130.

CHAPTER FIVE

Procedure in Educational Research—B
Survey & Collection of Related Information

Need to know about related literature in any field of enquiry. Availability of sources and possession of knowledge about them, both are necessary. Two forms of such literature—direct and indirect. Direct, i.e. *educational literature : periodicals, journals, books, bulletins, yearbooks, theses, government publications, etc. Indirect,* i.e. *guides to educational literature : encyclopaedias, indexes, abstracts, bibliographies and directories, biographical references etc. Available sources of each type indicated—American, English, Indian and International. Survey of the sources and collection of useful data—preliminary reading, critical reading, compiling a bibliography and note-taking.*

"Practically all human knowledge can be found in books and libraries. Unlike other animals that must start anew with each generation, man builds upon the accumulated and recorded knowledge of the past."[1]

For any worthwhile study in any field of knowledge the research worker needs an adequate familiarity with the library and its many resources. Only then will an effective search for specialized knowledge be possible. The search for reference material is a time-consuming but very fruitful phase of a research programme. Every investigator must know what sources are available in his field of enquiry, which are those he is to use and where and how to find them.

In the field of education, as in other fields too, the research worker needs to acquire up-to-date information about what has been thought and done in the particular area from which he intends to take up a problem for research. But it is found that generally the extent of important, up-to-date information regarding educational researches and ideas possessed by educational workers is very limited. Good, Barr and Scates quote the poor results of investigations carried out on this point by D. A. Worcestor and Ashbaugh, and rightly conclude that the present status of professional information in education

[1] John W. Best, *op. cit.*, p. 31.

was at a very low level.[2] Availability of adequate information and possession of sufficient familiarity with it, however, are not one and the same thing. Availability of adequate information about educational thought and research does not by itself result in possession of its knowledge by the researcher. The researcher must apply himself keenly to the task. On the other hand, a research worker may be very keen to possess up-to-date information regarding his field, and may try hard to be posted up-to-date, and yet fail to get enough information due to the non-existence of sources of such information. In our country the research workers come across the latter handicap primarily.

Survey of related literature, besides forming one of the early chapters in a research report for orienting the readers, serves some other purposes. Good, Barr and Scates analyse these purposes as[3]:

1. to show whether the evidence already available solves the problem adequately without further investigation, and thus to avoid the risk of duplication ;
2. to provide ideas, theories, explanations or hypotheses valuable in formulating the problem ;
3. to suggest methods of research appropriate to the problem ;
4. to locate comparative data useful in the interpretation of results, and
5. to contribute to the general scholarship of the investigator.

Sources of information, existing in any field of research, found in the library may be of two types : *direct* and *indirect*. In the field of education, the direct sources of information are available in the form of *educational literature* of the following types :

(1) Periodical literature found in journals,
(2) Books, monographs, yearbooks and bulletins,
(3) Graduate, doctoral and other theses, and
(4) Certain miscellaneous sources—like Government publications on Education.

The indirect sources of information—or *guides to educational literatare*—are available in the form of :

(1) Encyclopaedias of education.
(2) Education Indexes.

[2] Carter V. Good, A. S. Barr and D. E. Scates, *op. cit.*, pp. 167-168.
[3] *Loc. cit.*

(3) Education Abstracts.
(4) Bibliographies and Directories.
(5) Biographical References.
(6) Quotation Sources.
(7) Miscellaneous other sources.

We would do well to discuss first the Guides to Educational Literature, and then the Literature in Educational Research itself.

A. GUIDES TO EDUCATIONAL LITERATURE

A research worker needs some guides to relevant related literature—some convenient handles which will draw out all the material he needs, and also tell him what the material available exactly is.

1. Encyclopaedias of Education

Encyclopaedias, as we know, imply a huge or multi-volume work containing articles of both biographical and general character. So also in education, encyclopaedias are the work of a group of experts in the various fields of education. Organization of all the content of educational encyclopaedias is usually alphabetic, but sometimes dual too—(*i*) general topic arrangement in one alphabetic sequence, and (*ii*) biographical arrangement in another alphabetic sequence. A complete and finely detailed index, extensive cross-references or short entries and various symbols are invariably included. The spirit of articles in a good encyclopaedia on education is scholarly, and the over-all pattern determines the nature and form of individual articles, which must conform to that pattern in style, manner and tone. A balanced selection of topics included should accurately represent education at all stages—in its various aspects. This is another mark of a good educational encyclopaedia.

(i) Among encyclopaedias of education, Walter S. Monroe's *Encyclopaedia of Educational Research* must hold the pride of place. It was issued by the American Educational Research Association, New York, published first in 1941, then revised in 1950. It contains 241 critical articles by various authors on practically every aspect of education with over 12,200 bibliographical references to significant research studies. It cites

outstanding researches on educational problems carried out in U.S.A. Each article is written by a specialist. The scheduled new edition of 1960 will be including reports of educational research not only in America, but in other counties as well.

(ii) Another American encyclopaedia that needs mention here is the *Encyclopaedia of Modern Education*, prepared by Henry D. Rivlin, and H. Schueller, published at New York in 1943 by the Philosophical Library. It is the work of over 200 contributors. It covers the entire field of education and also gives the biographies of important educationists.

(iii) There is another old but useful encyclopaedia by Paul Monroe published at New York by the Macmillan Co. (1911-13) in 5 Volumes. It contains basic educational information of a historical nature and covers all countries and periods.

Encyclopaedia of Child Guidance, New York : Philosophical Library, 1943, by Ralph B. Winn, and *Encyclopaedia of Vocational Guidance*, New York : Philosophical Library, 1948, by Oscar J. Kaplan, are examples of encyclopaedias in specialized fields of education.

In our country, so far, there is no encyclopaedia of educational research. More than ten years ago, Shri J. P. Naik had initiated a move towards preparing an Encyclopaedia of Indian Education. Through the Journal of Indian Education, requests were reached to all quarters where educational research had taken place in the country for submitting relevant information for the purpose. But, as is evident, such steps as were taken did not bring about satisfactory response with the result that the intended publication of the encyclopaedia remained just a dream. That there is urgent need for such a work in our country for purposes of reference and guidance in further research goes without saying. The earlier an encyclopaedia is compiled in our country, the better for the future research workers in education.

2. Education Index

Index as a guide to literature serves the same purpose as the index of a book or the card file of the library. It identifies the source of the article or book cited by listing the titles alphabetically, under subject and author headings. Most indexes provided complete directions for locating the article or book

mentioned.

Indexes may be general or specialized. Among specialized indexes stands the *Education Index*, New York: H.W.Wilson Co. 1929-date. It is issued monthly (September through June), annually and again every three years. It is the most valuable single source or guide to periodic literature in education, having served as a comprehensive index of practically all publications in education. It lists :

(*i*) All books on professional education.
(*ii*) Yearbooks and other publications of professional societies and associations.
(*iii*) Publications of the U. S. Office of Education.
(*iv*) Publications of N. E. A. and its branches.
(*v*) Bulletins, monographs and reports on education.
(*vi*) Articles in about 175 educational periodicals.
(*vii*) Articles on education in non-professional publications.
(*viii*) Book reviews and Book lists.
(*ix*) Bibliographies published.
(*x*) Courses of study published.
(*xi*) Resource and teaching units.
(*xii*) Tools of research and evaluation.
(*xiii*) Reference books.
(*xiv*) Names of foundations and associations.
(*xv*) Meeting dates of professional education associations.

References are not carried from one three-year book to the next. Among the *general indexes* published in America the following are of long standing.

(*i*) *Readers' Guide to Periodic Literature*, New York : M. W. Wilson Co., 1900-date.
(*ii*) *International Index to Periodic Literature*, New York : M. W. Wilson Co., 1913-date.
(*iii*) *Cumulative Book Index to Periodic Literature*, New York : M. W. Wilson Co., 1928-date.

These general indexes have been of considerable help to educational workers.

In England the educationalindexing project is carried out by the librarians of the various Institutes of Education:

(*i*) *Index to Selected British Educational Periodicals.* (Leeds), Librarians of Institutions of Education, 1954—

date, thrice per year. The index covers 41 educational periodicals excluding the periodicals on fundamental and adult education which are indexed elsewhere. There are two parts to the index : Part I—Subject Index, and Part II—Author Index. The subject index is wide and includes cross reference by countries.

(*ii*) National Institute of Adult Education. *A select bibliography of adult education in Great Britain*, including works published to the end of the year 1950, London, 1952, with some supplements. It is an annotated bibliography of the most important books, pamphlets and articles appearing on the subject in the U. K. The entries in each issue are classified under different headings. It lists articles from twelve periodicals.

(*iii*) *British Education Index*. Vol. I, August 1954 to November 1958. Compiled by The Librarians of Institutes of Education, The Library Association, 1961. 122 pp. The work includes references to articles of educational interest which have been published in more than fifty periodicals during the period of four years. Further volumes on the same lines are promised at intervals in the future. The volume has been widely welcomed.

Besides the above specialized indexes, there is an important *general index* in the U. K. which proves of great help to the educational researchers too.

(*iv*) *Subject Index to Periodicals*, London. The Liberary Association, 1919-date, Quarterly with annual cumulation. It includes select articles from over 300 periodicals of U. K. Among them are included about 10-15 educational journals, grouped under various headings. The articles on educational appear under the sub-headings of : education and museums, education of adults, education of women and educational psychology.

In our country indexing service in education is of recent growth. It started with the publication of the *Education Quarterly*, Delhi, Ministry of Education, in 1949. Each issue of this Quarterly Journal carried a section entitled '*Index to Articles*' which provided an Author and Subject Index to fifteen repellant of the principal Indian educational periodicals. Each

issue contained from 300 to 400 entries, which were cumulated periodically. In the place of this Index, we have now IEI—*Indian Education Index*—a monthly bulletin issued by the Central Secretariat Education Library which indexes articles of important Indian educational journals.

3. Educational Abstracts

The reference guides literature known as *abstract, digest*, or *review* provide not only a systematized list of reference sources, but also include a summary of the contents of each article. Usually the summaries are brief. Such strictly and efficiently utilitarian literature has become current in many branches of knowledge. In many advanced countries educationists have their special 'Educational Abstracts' to serve them.

In America the most useful of these references are the following :

(*i*) *Review of Educational Research, Washington*, American Educational Research Association (N.E.A.) 1931—date Published five times each year, it briefly summarizes research findings in education under eleven major areas in three-year cycles—Administration, Curriculum, Educational Measurement, Educational Psychology, Guidance, Mental and Physical Development, Language Arts, Research Methods, Special Programs and Teacher Personnel.

(*ii*) *Education Digest*, Ann Arbor, Michigan, 1935—date, monthly, September to May. It publishes select articles, reduced to digest form, from various U.S. educational periodicals and reports. About 200 articles selected for their current educational interest in U.S. education are digested per year. An author index is included in each issue.

(*iii*) University Microfilms. *Dissertation Abstracts*, a guide to dissertations and monographs available in microfilms (monthly).

In India, the Ministry of Education, since 1955, has been issuing *Indian Education Abstracts* every three months. It confines itself to books and periodicals on education published in India or pertaining to Indian Education in English and

Hindi. Over 50 Indian Journals are indexed in the various issues. Subject headings under which the abstracts appear are varied—*e.g.* philosophy of education, educational psychology, tests and measurements, examinations, students and students' organizations, educational and vocational guidance, teachers and teacher training, curriculum, basic education, health and physical education, elementary, secondary, vocational and technical education, higher education, social education and educational extension, etc.

Each entry includes the usual bibliographical details and indicates special features like graphs, tables and bibliographies, etc. together with a synopsis of the articles indicating "the purpose of the author and/or the conclusions he arrives at".

Each issue comprises about 125-150 entries and contains about 50 pages. An annual cumulative author index is given to each volume in the last issue of the Volume.

Available in the field of Basic Education in India are the *Basic Education Abstracts* published by the National Institute of Basic Education, first in a mimeographed edition, 'intended to be a record, not a collection of critical reviews of the literature in the field'. The first issue covers books in Basic Education and articles, comments, and editorials, etc. published in journals and periodicals in English and Hindi. The second issue has included work in Hindi, Marathi, Gujrati and Bengali also. The B. E. A's cover—

(*i*) Philosophy and Theory,
(*ii*) Curriculum,
(*iii*) Teaching Techniques,
(*iv*) Craft,
(*v*) Teachers and their Training,
(*vi*) Health and Hygiene,
(*vii*) Social Service,
(*viii*) Reports of State Departments,
(*ix*) Reports of Conferences and Workshops,
(*x*) History and Surveys,
(*xi*) Abstracts of researches and other publications, and
(*xii*) Short Comments, Notes, etc.

Indian Institute of Education, Bombay, *Educational Studies and Investigations*. Bombay : Asia Publishing House, Vol.

I, 1957, is a series of synopses of educational research in various fields of education. *Macmillan Pamphlets* are also the Institute's publications which issue abstracts of educational research work. Many University Education Departments in India publish every year brief summaries of some of the researches in education undertaken by their M.A., M.Ed. and Ph. D. students and members of staff. Chief among these are those issued by Department of Education, University of Allahabad; Central institute of Education, Delhi; Education Department, Teachers' College, Udaipur; and Prantiya Shikshan Maha Vidyalaya, Jabalpur. *Educational Fieldwork and Research* published in 1953 by the Lucknow University for T.C.E. Journals Publications Ltd., was also of the nature of educational research abstracts.

Some international abstracts devoted to education must not remain without mention. They are :

1. *Foreign Education Digest* Berkeley, California, 1936-date. Quarterly which is divided into two parts. Part I contains, in English, about 35 digests, classified under distinct headings. Part II is an annotated bibliography of foreign education comprising about 75 items including 45 articles. Over half of the entries in both the parts are Journal entries. About 50 educational journals from 15 countries and several international organizations, and about 25 reports are the subject of this digest.
2. A *monthly Bulletin* published at Brussels since 1956 which contains a descriptive bibliography of studies and articles on vocational guidance.
3. *Education Abstracts,* Paris, UNESCO, 1940; monthly, except in July and August. Each introductory essay devoted to a particular aspect of education, is followed by abstracts of books and documents selected from various countries dealing with the topic under consideration.

4. Bibliographies and Directories

Devoted to educational research, serving as useful guides for educational workers, are some Bibliographies and Directories. A few examples of these in America are:

(*i*) Association of Research Libraries. *Doctoral Dissertations*

Accepted by American Universities, published yearly since 1934, organized by subject areas.

(*ii*) Lanke, T.A. & Silvery, Herbert M., *Masters' Theses in Education*, 1951.

(*iii*) Lyda, Mary Louise and Brown, Stanley B., *Research Studies in Education*, a subject index of doctoral dissertations, reports and field studies, 1941-51.

(*iv*) U. S. Office of Education, *Bibliography of Research Studies in Education 1928-41.*

(*v*) U. S. Office of Education. *Record of Current Educational Publications, 1912-1932.*

(*vi*) Young, Raymond J., *A Directory of Educational Research Agencies and Studies*, Bloomington, Indiana, Phi Delta Kappa, 1959.

In the U.K., examples of such bibliographical guides to educational research are :

(*i*) Kelly, Thomas, ed., *A Select Bibliography of Adult Education in Great Britain.* National Institute of Adult Education, 1952.

(*ii*) National Foundation for Educational Research in England and Wales. *A list of Researches in Educational Psychology presented for higher degrees in the Universities of the United Kingdom and the Irish Republic from 1918*, by A. M. Blackwell, London: Newnes Educational Publishing Co. 1950. Four such lists have appeared from 1918-1954.

(*iii*) Scottish Council for Research in Education, *Aids to Educational Research.* Revised edition, London: University of London Press, 1954.

(*iv*) Association of Special Libraries and Information Bureau, *Index to Theses accepted for higher degrees in the Universities of Great Britain and Ireland*, Vol. I., 1950/51, London, Aslib, 1953, Annual, classified by subject, including education.

In our country there have appeared very few bibliographical guides to educational researches on a national basis, covering the whole of India.

Uttara Bharati, Journal of Research of the Universities of the Uttar Pradesh, published quarterly, since 1954, at the

University of Lucknow, lists subjects of research undertaken in various fields for post-graduate degrees in U.P. only. *Register of Educational Research in India*, featured in the Vol. II of *C.E.L. Notes* (Ministry of Education, Government of India) presented a bibliography of educational research undertaken in various parts of the country.

Bibliography of Doctorate Theses in Science and Arts accepted by the Indian Universities for 1946-48 and 1948-50 has been published recently by the Inter-University Board of India. Theses are listed under University, with subject subheadings including education.

There are, however, some bibliographical guides to educational research being issued by the students and staff of institutions or Departments of Education, like those issued from time to time by The Central Institute or Education, *e.g.* in some issues of 'Studies in Education and Psychology'. The Department of Education, University of Allahabad, Vidya Bhawan Teachers' College and some other institutions publish a complete list of the dissertations undertaken every year by their students and staff in their own annual publications.

Among the international bibliographies and directories of educational literature and research arranged alphabetically, countrywise, one may mention the following :

(*i*) *Research in Education,* a directory of organizations, bibliographical materials and periodicals. Education Abstracts (Paris, Unesco), Vol. I, No. 2, February 1957.

(*ii*) *Educational Research,* selected reports, books on methodology, bibliographies and journals. Education Abstracts (Paris, Unesco), Vol. XII, No. 5-6, May and June 1960.

(*iii*) *Sources of Educational Publications of an Official Nature.* (Paris, Unesco), Education Abstracts, Vol. VIII, No. 10, December 1956.

(*iv*) *Access to current literature on educatian through periodical indexes.* (Paris, Unesco). Education Abstracts, Vol. IX, No. 1, January 1957.

(*v*) *An International List of Educational Publications.* (Paris, Unesco), Educational Studies and Documents, No. 23.

B—Educational Literature

Guides to educational literature discussed above are but the keys which give access to the educational literature—the primary source of information—itself. We will discuss now the direct sources of educational literature available to students and researchers in education, mainly in our country.

1. Periodical literature found in Journals

A periodical is defined as a publication issued in successive parts, usually at regular intervals. Included in this definition are not only journals, newspapers and magazines but also almanacs, yearbooks, directories, hand-books, government documents, publications of societies and associations, etc. But we will consider at present only the periodical educational literature found in journals which is of immense value in furnishing the most recent literature on the subject. Articles on new developments in education often appear in periodicals before books on the particular topics are published. Sometimes authorities on particular subjects do not write books at all and contribute only to periodicals. Educational periodicals thus become the most important direct source of current educational literature. Such educational journals may be general or devoted to special fields of education. An International List of Educational Publications issued recently by the UNESCO, (Educational Studies and Documents, No. 23) lists almost all educational periodicals—general and specific—current in various countries of the world. We will limit ourselves to listing only the educational journals current in India. For such journals in other countries the readers may refer to the source of information mentioned above.

Indian Journals on Education

GENERAL

Adhyapak—(1953); 4; 750; 36 pp.; Rs. 2/-; in Marathi. S.C. Walimbe, Chintamani Nivas, Station Road, Ahmednagar, Bombay State.

The Bihar Educationists/Bihar Shikshak—(1953); 4, 5580; 80 pp.; English-Hindi edition; Rs. 5/- ; Hindi edition Rs. 3/-.

Bihar Educationist Association, Mahendru, Patna 6, Bihar. S. S. Varma, Editor.

Bulletin of the West Bengal Headmasters' Association—(1951); 3 ; 900 ; 51 pp.; O. Manindra Kumar Ghosh, 18, B, Syamacharan De Street, Calcutta-12.

C.I.E. News Letter—(1955); 12 ; 500; 16 pp. ; Coordinator, Dept. of Extension Service, Central Institute of Education, Delhi-8.

Christian Education—(1921) ; 4 ; 1000 ; 60 pp. ; Rs. 8. Council of Christian Education, Methodist Church in Southern Asia, 3 Wesley Road, Jabalpur, M.P., Rev. G. Sundaram, Editor, Ante: Methodist Education (1921-1923).

Education (Hindi)—(1922); 12 ; 1000; 48 pp. ; Rs. 10/-. T. C. E. Journals and Publications Ltd., P. O. Box. 63, Lucknow, L. Mukerjee, Editor.

The Education Quarterly—(1949) ; 4 ; 200 ; 45 pp.; Rs. 8/- (abroad, Rs. 11/- or 14$). Publication Branch, Government of India, Civil Lines, Delhi-8.

Educational India—(1934) ; 12 ; 1000 ; 32 pp. ; Rs. 4/8/-. M. Seshachalam, Masulipatam, South India, M. Venkatarangaiya, Editor.

The Educational Review—(1895) ; 12 ; 700 ; 20 pp. ; Rs. 5/-. M. R. Sampathkumaran, 16 Sunkuwar Street, Triplicane, Madras-5, A. N. Parasu Raman, Editor.

The Educator : A Quarterly Education Journal—(1945) ; 4 ; 1000 ; 64 pp.; Rs. 5/-. University Training College, Nagpur, M. Verma, Editor.

Indian Education—(1955); Rs. 4 ; 60 ; 60 pp. ; Rs. 6/-. Indian Educational Association, Headquarters, Balwant Rajput College, Agra, R. K. Singh, Editor.

Indian Education Abstract—(1955) ; 4 ; 1000 ; 64 pp. ; Educational Abstracting Service, Central Educational Library, Ministy of Education, New Delhi.

Jan Shikshan—(1936) ; 12 ; . . . . ; 28 pp. ; Rs. 5/-; in Hindi, Vidya Bhawan Society, Udaipur, Rajasthan, K. L. Shrimali, Editor. Ante : *Balhit* (1936-1949).

The Journal of Education—(1953) ; 4 ; 400 ; 52 pp. ; Rs. 2/-. K. Bose, General Secretary, West Bengal College and Univer-

sity Teachers' Association, 10 Harmohan Ghosh Lane, Calcutta-10.

Journal of the Mysore State Education Federation—(1947) ; 4 ; . . . . ; 30 pp. ; Rs. 3/- ; Office of the Director of Public Instruction, Bangalore, D. Visweswaraiya, Editor.

Nai Shiksha—(1950) ; 12 ; 2500 ; 50 pp.; Rs. 4 8/-; in Hindi. Kailash Chaturvedi , Tehvildaran-Ka-Rasta, Jaipur. Raghuvir Chaturvedi, Editor.

New Education—(1949) ; 4 ; 1000 : 90 pp. ; Rs. 4/-. Teachers' College Saidpet, Madras-15.

Nutan Shikshan—(1935) ; 12 ; 1000 : 40 pp. ; Rs. 5/- (abroad Rs. 8/-); in Gujrati. M. K. Naik, Katargam, Surat, Harbhai Trivedi, Chandravandan Shah, Editor.

Progress—(1955) ; 12 ; 1500 ; 400 pp. ; Rs. 3/-, English/ Malayalam/Tamil. Government High School, Haripad, T. C. State, A. K. Raja Verma, Editor.

The Progress of Education—(1924); 12 ; 1000; 40 pp. ; Rs. 6/9/-. S. D. Chitale (for Poona Anath Vidyarathi Girls), 624 Sadashiv Peth, Poona-2, N. V. Kinkar, etc. Editors.

Punjab Educational Journal—(1924) ; . . . . ; 70 pp. ; Rs. 6/-. English/Hindi/Punjabi. M. Gulab Singh and Sons, Ltd., Nicholson Road, Delhi, G. D. Khanna, Editor (English), Sohan Lal Sharma, Uttam Singh, Editors (Hindi-Panjabi)).

Rajasthan Shikshak—(1954) ; 12 ; 2000 ; 32 pp. ; Rs. 5/- ; in Hindi, Ayodhia Prasad Gaur, Janki Niwas, I. B. Sardarpura, Jodhpur.

The School World—(1934) ; 6 ; 750 ; 28 pp. ; Rs. 3/-. K. G. Warry, 117 Thalakwadi, Belgaum, Bombay State, Ante : The Karnatak School World.

Shiksha—(1948) ; 4 ; 2100 ; 200 pp. ; Rs. 7/-. English/Hindi, O.S.D. Shiksha, Office of Director of Education, Uttar Pradesh, Ashok Marg, Lucknow. U.P.

Shikshak—(1947) 12 ; 10,000 ; 65 pp.; Rs. 5/4 ; in Bengali, S. Rai Choudhri, Shikshak Publishing House, 61 Ballygunge Place, Calcutta-19, Mohitosh Rai Choudheri, Editor.

Shikshan Ane Sahitya—(1939) ; 12 ; 1000 ; 40 pp. : Rs. 4/- ; in Gujarati, Jivanji Dayabhai Desai, Navjivan Mudranalya, Ahmedabad-14, Jagatram Dave, etc. Editors.

Shikshan Sadhana—(1953) ; 2 ; 200 ; 48 pp.; Rs. 3/4 ; in

Gujrati, Basic Training Centre, Rajpipla District, Broach, Bombay State, M. M. Shukla, Editor.

The South Indian Teacher—(1928) ; 12 ; 1000 ; 40 pp.; Rs. 5/-. South Indian Teachers' Union, 520 High Road, Triplicane, Madras-5, S. Natarjan, Editor.

The Teacher's Journal—(1922) ; 12 ; Rs. 7/-. Moti Ranjan Mookerjee, A. B. T. A. Office, 15 Bankim Chatterjee Street, Calcutta.

Vidyadayini—(. . . .); 12 . . . . ; 32 pp. ; Rs. 1/12 ; in Kannada. The New Education Fellowship, Mysore, A Shesha Iyengar, Editor.

Vindhya Shiksha—(1953) ; 12 ; 1000 ; . . . . ; Rs. 4/8/- ; in Hindi, Government of Vindhya Pradesh, Department of Education, Rewa, R. M. Chaturvedi, Editor.

RESEARCH

Education and Psychology/Shiksha Aur Manovigyan—(1953) ; 4 ; 400 ; Rs. 6/- ; English/Hindi, Hauz Kazi, Delhi-6. Prayag Mehta, Udai Pareek, J.M. Ojha, Editors.

Journal of Education and Psychology—(1942) ; 4 ; 700 ; 65 pp.; Rs. 6/-. Faculty of Education and Psychology, M. S. University, Baroda State, Bombay, T. K. N. Menon, Editor. (Now published by the Editor).

PRIMARY

The Balar Kalvi—(1936); 12 ; 500 ; 16 pp. ; Rs. 2/-; in Tamil, South India Teachers' Union, 520 High Road, Triplicane, Madras, S. Natrajan, Editor.

Gujarat Shalapatra—(1862); 12; 2500 ; 40 pp. ; . . . . ; in Gujarati, S.P. Shukla, Pr. Training College for Men, Ahmedabad.

Payam Taleem—(1925) ; 12 ; 1000 ; 56 pp; Rs. 4/- ; in Urdu, Maktaba Jamia Ltd., Jamia Nagar, Delhi, Hamid Alik Khan, Athar Parvez, Editors.

Prathamik Shikshan—(1928) ; 12 ; 4700 ; Rs. 4/- ; in Marathi, T. P. Attarde, Poona.

Shikshak—(1922) ; 12 ; 1550 ; 40 pp. ; Rs. 3/- ; in Marathi, B. G. Jagtap, 1248 Shukrawar Peta, Poona.

Shikshan Patrika—(1933) ; 19 ; 1000 ; 24 pp. ; Rs. 4/- ; in Marathi, Nutan Bal Shikshan Sangh, Poona-2, Mrs. Malinibai Paranjape, etc. Editors.

SECONDARY

The Eastern Educationist—(1928) ; 12 ; 1000 ; 48 pp. ; Rs. 7/8/- ; English/Hindi, Bihar Secondary School Teachers' Association, Nageshwar Singh, President, District-Patna, Bihar, R. R. Sinha, Editor. Ante; Bihar and Orissa Teachers' Journal.

Educational Forum—(1956) ; 4 ; 3000 ; 65 pp.; Rs. 3/-. Ministry of Education, Government of India, New Delhi. (Now, Alumni Association, Central Institute of Education, Delhi).

Secondary Education—(1956) ; 4 ; 3000 ; 65 pp ; Rs. 2/-. Ministry of Education, Government of India, New Delhi.

Shiksha-O-Sahitya and Teachers' Journal—(1921) ; 12 ; 1600 ; 100 pp. ; . . . . ; Bengali/English, Mohit Ranjan Mukerjee, C/O All Bengal Teachers' Association, 15 Bankim Chatterjee Street, Calcutta-12. Smt. Anila Devi, Editor.

Teaching—A Quarterly technical journal for teachers—(1928) ; 4 ; 1800 ; 36 pp.; Rs. 4/-. Oxford University Press, P. B. 31, Bombay. Margaret Benjamin, Editor.

VOCATIONAL AND TECHNICAL

Careers and Courses—(1949) ; 12 ; . . . . ; 100 pp. ; Rs. 9/-. 94 Baird Road, P. B. 319 New Delhi, Prithvinath Bhat, A. C. Goyal, Editor.

Careers Today—(1948) ; 12 ; 2000 ; 40 pp. ; Rs. 6/-. 1750 Sohanganj, Delhi, H. C. Barjahi, Editor.

Journal of Association of Principals of Technical Institutions—(1948) ; 4 ; 400 ; 75 pp. ; Rs. 6/8. C/O Delhi Polytechnic, Delhi, J. C. Ghosh, etc. Editors.

Journal of Vocational and Educational Guidance—(1954) ; 4 ; 450 ; 50 pp. ; Rs. 6/-. All India Educational and Vocational Guidance Association, Faculty of Education and Psychology, University of Baroda, Baroda 3, H. P. Mehta, Editor.

SPECIAL

The Deaf in India—(1949) ; 4 ; 1000 ; 32 pp. ; Convention of the Teachers of the Deaf in India, 50 Blondel Road, Calcutta-19. A. C. Sen, B. K. Chakrabarti, Editors.

Deepavali—A periodical devoted to the education and welfare of the blind—(1948); 4 ; 500; 30 pp. ; . . . . ; English/Hindi; also a Braille edition in Hindi, Ministry of Education, Government of India, New Delhi.

ADULT AND WORKERS

The Adult Education Bulletin—(1952); 4-6 ; 500 ; 15 pp. ; C/O The Mysore State Adult Education Council, 1253 Krishnamurthipuram, Mysore, T. V. Thimme Gowda, Editor.

The Adult Education Review—(1948); 4 ; 500 ; 22 pp. ; T. J. R. Gopal. C/O The South Indian Adult Education Association 31 Palathope, Mylapore, Madras-4.

Indian Journal of Adult Education—(1939) ; 4 ; 3000 ; 65 pp. ; Rs. 5/-. Indian Adult Education Association, 30 Faiz Bazar, Delhi, Mrs. Leela Shukla, Editor.

Janashiksha—(1939) ; 6 ; 1250 ; 40 pp.; Rs. 1/8/- ; in Assamese. Social Education Department, Government of Assam, P.O. Gauhati, Assam, Nirmeleswar Sarma, Editor.

Janjiwan—(1950) ; 52 ; 2000; 14 pp. ; Rs. 1/8; in Hindi, Social Education Board, Government of Bihar, Patna, B. K. Narain, Editor, Ante : Roshini.

Naya Shikshak—(1950) ; 12 ; 1500 ; 60 pp. ; Rs. 5/-. English/ Hindi. Education Department, Bikaner, Shambu Lal Sharma, Editor.

Pustake Prapancha—(The World of Books)—(1946); 12; 1500 ; 64 pp. ; Rs. 5/-; in Kannada. Mysore State Adult Education Council, 1253, Krishnamurthipuram, Mysore, G. Hanumantha Rao, Editor.

Samaj Shikshan—(1950) ; 12 ; 32 pp.; Rs. 6 per issue. Hindi/ Rajasthani. Lok Shikshan Vibhag, Rajasthan Vishva Vidyapeeth, Udaipur, Bhawanishankar Garg, Editor.

Social Education—News Bulletin—(1950) ; 12 , 2000 ; 8 pp. ; Rs. 3/-. Indian Adult Education Association, 30 Faiz Bazar, Delhi, Dolat Nanavatty, Editor.

Talim-O-Taraqqui—(1949) ; 12 ; 1200 ; 32 pp.; Rs. 4/-. Hindi/ Urdu, Idara Talim-O-Taraqqi, Jamia Millia Islamia, Jamia Nagar, New Delhi, Barkat Ali Firaq, Editor.

The Vidyapeeth—(1954) ; 4 ; 500 ; 18 pp. ; . . . . ; in Kannada Mysore State Adult Education Council, 1253 Krishnamurthipuram, Mysore.

FUNDAMENTAL

Buniyadi Shiksha—Organ of the Bihar Basic Education Association—(1951); 12; . . . . ; 48 pp. ; India, Pakistan and Ceylon Rs. 5/-, Burma Rs. 6/-, Abroad Rs. 8/- ; in Hindi. Bihar

Rajya Buniyadi Shikshak Sangh. Mahendru, P.O. Patna-6, Ram Saran Upadhyay, Editor.

Nai Talim (Basic Education)—(1939) ; 12 ; 1700 ; 32 pp.; Rs. 3/-; in Hindi, The Secretary, Hindustani Talimi Sangh, Sevagram, Wardha, M.P. Asha Devi Aryanayakam, Marjorie Sykes, Editors.

AUDIO-VISUAL

Audio-Visual News. Official Bulletin of the Audio-Visual Aids Committee of the National Christian Council of India—(1948) ; 4 ; 1200 ; 16 pp.; Rs. 1/8. Lucknow Publishing House, 37 Cantonment Road, Lucknow, U. P. Donald F. Ebright, Editor.

SPECIAL SUBJECTS :

Bulletin of Physical Education/Bulletin d'education Physique—(1949) ; 4 ; 1000 : 60 pp.; Eng.—Fr.-Hindi edition Rs. 6/8 ; Eng.-Fr. edition, Rs. 5/-. Aurobindo Ashram, Pondicherry, South India.

Journal of Physical Education and Recreation—(1952) ; 4 ; 500 ; 50 pp. ; Rs. 8/-. T. I. P. E., Kandivli, Bombay State, P. D. Haldanker, Editor.

Teaching English—(1954) ; 4 ; 100 ; 32 pp. ; Rs. 3/-. Orient Longmans Ltd., 17 Chittaranjan Avenue, Calcutta-13.

Vyayam—Journal of Health, Physical Education and Recreation (1926) ; 4 ; 32 pp. ; Rs. 5/-; in English, J. P. Thomas, Y.M.C.A. College, Saidapet, Madras, C. C. Abraham, Editor.

2. *Some Books on Methodology of Educational Research*

There are a number of books in the English language available on educational research found useful by the research workers in education. Some of them are the following.

(*i*) Barr, Avril S., Robert A. Davis, Palmer O. Johnson, *Educational Research and Appraisal.* Chicago. J. B. Lippincott, 1953. 362 pp.

This book provides a survey of the major methods of problem solving and evaluation in education as well as a basis for both field practice and instruction in methods of thesis writing. It stresses research that may be conducted in school settings as a basis for action. It includes two appendices : one dealing with the writing of a thesis and the other with references for further analysis and study.

(*ii*) Best. John W., *Research in Education.* Englewood Cliffs, New Jersey, Prentice-Hall, 1959. 320 pp.

Written for the graduate students as well as the graduate teacher-students, the book concerns itself with the meaning, characteristics and definitions of research of various kinds, with the processes of educational research—the selection and evaluation of the problem, the use of reference materials, the carrying out of historical, descriptive and experimental research, with the tools of research—questionnaires, interviews, tests, etc., the interpretation of the data collected and their statistical analysis. The book ends with advice on how to write a research report. It also reports upon three significant research studies—their planning and execution.

(*iii*) Good, Carter V., *Introduction to Educational Research.* New York, Appleton-Century-Crofts, 1959. 424 pp.

An introductory book on research methods for field workers, graduate students and seniors in the undergraduate colleges, it is intended to serve the purpose of both producers and consumers of research discussing concepts, principles and procedures. The series of chapters follows the steps of reflective thinking beginning from the formulation of hypotheses and ending with the preparation of the research report. Analysis and interpretation of data are presented in the functional setting of the chapters rather than as separate discussion.

(*iv*) Good, Carter V., Douglas E. Scates, *Methods of Research, Educational, Psychological, Sociological.* New York, Appleton-Century-Crofts, 1954. 920 pp.

Divided into ten long chapters on different aspects of research not merely educational but psychological and sociological too, this book discusses concepts, principles, and procedures rather than being a 'recipe book', 'rule book' or a series of 'lesson plans' for problem solving, reflective thinking and research. The presentation of a common pattern of research methodology in education, psychology and sociology has been possible because of the increasing interdependence of problems and procedures in these areas. In many instances the discussion of a particular problem of technique, in this book, is in the form of a series of questions for students to think through, with attention directed to the available literature,

because the answer may not be yet known.

(v) Good, Carter V., A. S. Barr, and Douglas E. Scates, *Methodology of Educational Research.* New York: Appleton-Century-Crofts, Inc., 1941. 890 pp.

A relatively older publication than the other books listed here, it is yet considered by most educational workers as the Bible of educational research, masterful as its treatment of the subject is. Addressed to field workers and graduate students in education, this volume is a sound, systematic, coherently organized treatment of the techniques of scientific research. A number of troublesome items were treated in this book for the first time. All later writers are indebted to this book in some respect or the other. Graduate students have been particularly aided by it through suggestions for finding problems and starting research.

(vi) Rummel, J. Francis, *An Introduction to Research Procedures in Education.* New York, Harper, 1958. 413 pp.

Presented as an orientation to research procedures, this book is intended for both the consumers and producers of educational research. Basic considerations in research methodology are accompanied by suggested references for more intensive study. The book is organized to follow substantially the steps of problem-solving. It deals with the nature of the scientific method of research and the selection of research problems. It discusses the development of a research proposal, with illustrative examples, an important but seldom presented feature in other publications. The techniques of data collection, the basic problems involved in planning for the analysis and interpretation of data, the basic concepts of statistics, experimental designs, and scaling problems and techniques are presented in sufficient detail. Electro-mechanical techniques of sorting, classification and computation of data—an important part of research procedures these days—receives a much needed consideration in this book. Appendices A and B present several short-cut methods for statistical calculations and examples of questionnaires and covering letters respectively.

(*vii*) Travers, Robert M. W., *An Introduction to Educational Research.* New York, Macmillan, 1958. 466 pp.

Planned for use in the training of educational research workers, this book also provides interpretation of the aims and methods of educational research for others connected with education in various capacities. The topics discussed in the book are: groundwork for research; conducting research within a framework of theory ; the content of educational research; selecting the problem ; measurement in research, the use of multiple observations in measurement, validity of measurement; the nature of observation and some direct approaches; observation, more complex procedures and indirect approaches; survey methods; prediction studies; studies of development; experimentation in education; problems of research design; data processing and reporting. A useful bibliography of background materials is included.

(*viii*) Wiseman, Stephen, *Reporting Research in Education.* Manchester (England), Manchester University Press, 1952. 21 pp.

Divided into two main parts, this book discusses, in Part I, major considerations in the preparation of a thesis on experimental education—its form and length, its general pattern, stating and outlining the problem, reviewing relevant literature, describing the design and measurement techniques, stating, discussing and interpreting the results of the experiment, summarising and drawing conclusions, and the accepted bibliographical presentation. Part II, treating the problem of preparing a research paper for publication, distinguishes the latter from the former and advises the author of published papers about how to mould his materials.

(*ix*) Barnes, John, B., *Educational Research for Classroom Teachers.* The Putnam series in Education: Arizona State University, 1960. 229 pp.

The author introduces the reader to a kind of research that is teacher-oriented and to a kind of teaching that is research-oriented. Illustrating with real cases, he shows three large areas in which research may be profitably applied: the study of individuals, the study of classroom groups and sub-groups, and the study of teaching and learning problems. Beginning

with a discussion on 'The Nature of Educational Research', the book includes in its main body actual case-studies of individual pupils, particular groups of pupils, and of particular teaching and learning problems. The appendices include worthwhile material on "Research and the Administrator" and "Research and the Educational Consultant."

(*x*) Corey, Stephen M., *Action Research To Improve School Practices.* New York: Bureau of Publications, Teachers' College, Columbia University, 1953. 161 pp.

In the first chapter, the author defines action research, differentiating it from traditional educational research. In the following chapters, the process of action research is described and illustrated; two action research studies are reproduced; the relativity of research quality is considered and some of the conditions favourable to action-oriented educational experimentation are described. Then, there is a report of a seminar in which action research was employed as a method of learning. The book finally discusses and explains some simple statistical procedures and sampling problems useful in action research. The final chapter is a brief summary and concluding statement.

(*xi*) Whitney, Frederick L., *The Elements of Research.* New York : Prentice-Hall, Inc., 3rd ed., 1954. 539 pp.

The book consists of sixteen chapters and five appendices. It deals with all the aspects of research—reflective thinking, science and research; research traits and abilities; the research problem; the evaluation of previous research; the agendum of procedures; the collection of evidence; the descriptive, historical and experimental methods, the philosophical, prognostic, sociological and creative types of research, research in curriculum-making; the classification of research material and the research report. The appendices give samples of reports of Doctors' and Masters' studies from institutions of higher education, lists of representative educational research problems, educational research sources, representative federal surveys of education in the United States and agenda for eight types of research studies.

3. Monographs, Yearbooks, Bulletins and Survey Reports

A broad field of periodical educational publications is represented by bound volumes in the form of monographs, year-

books, bulletins and reports. In America, larger schools of education publish a large number of research studies in education in the form of monographs. There are many series of monographs thus issued by the Universities and Teachers' Colleges of the U.S.A. (*e.g. Supplementary Educational Monographs, Educational Research Monographs, Lincoln School Monographs).* Similarly there are issued, every year, other publications entitled *Bulletins* which report on educational activities and researches carried out on various topics of current interest. In England too, the various Institutes of Education publish monographs and bulletins from time to time. In India, only a limited number of comparable literary sources exist at present.

Yearbooks of Education are bound volumes appearing once a year, containing educational papers by eminent educationists. Among Yearbooks of Education the following deserve special mention :

(*i*) Lauwerys J.A. and others, eds., *Yearbook of Education,* London, Evans Bros. Ltd., 1953-date.

Prepared under the joint editorial responsibility of the University of London, Institute of Education, and the Teachers' College, Columbia University, each of its issues is devoted to some particular aspect of education which is described at length by more than fifty eminently qualified persons from all over the world. (It was published under the responsibility of only the London, Institute of Education from 1932 to 1952). The different aspects of education treated so far in this Yearbook are :

1953 Status and Position of Teachers
1954 Educational and Technological Development
1955 Educational Counselling
1956 Education and Economics
1957 Education and Philosophy
1958 The Secondary School Curriculum
1959 Higher Education
1960 Impact of Mass Media of Communication on Education
1961 Concepts of Excellence in Education.

(*ii*) Jeffery G.B., ed., *Yearbook of Education.* University of London, Institute of Education, Evans Bros. Ltd., 1932-40, 1948-date.

This yearbook contains signed articles on all phases of educational development in all English-speaking and major European countries.

(iii) Kandel I. L., ed., *Educational Yearbook of the International Institute of Teachers' College.* New York : Bureau of Publications, Columbia University, 1928-44. 20 Volumes.

This is an excellent reference for comparative education describing various national systems of education. Most of the volumes are devoted to some particular aspect of education, *e.g.* adult education and rural education.

Another kind of educational yearbook is represented by the *International Yearbook of Education*, published by the UNESCO ever since 1948, which presents a review of educational developments for the previous year in more than forty-five countries. In such yearbooks the emphasis is upon a great number of current detailed facts, rather than on written articles of a background nature. Almanacs, Directories, Handbooks and Survey Reports are allied to this kind of yearbook. These are available on a national, regional, state as well as local level and supply concise factual information of statistical or identifying character.

4. *The International Sources of educational publications of an official nature* are :

(i) Bulletin of the International Bureau of Education, Geneva. 1927-date, Quarterly, having both English & French editions.

(ii) Education Abstracts, Paris, UNESCO. 1940-date. Monthly except July and August.

(iii) Educational Studies and Documents. Paris, UNESCO. 1950, irregular.

(iv) International Review of Education. UNESCO Institute for Education, 1955-date, Quarterly.

(v) World Survey of Education. Handbook of educational organizations and statistics. Paris, 1955.

(vi) Bibliography of education in non-self-governing territories. United Nations. Lake Sucess, N. Y., 1949.

COLLECTION OF USEFUL DATA

Once the proper keys to educational literature are secured and utilized for the purpose of opening the locks of knowledge stored in books and journals, etc., the research worker has to engage himself actively in reading and studying the latter and in sorting, sifting out and noting what is relevant to and significant for his purpose. This stage is thus divisible into the following steps :

(a) Preliminary reading,
(b) Critical reading,
(c) Compiling a bibliography, and
(d) Note-taking.

Preliminary Reading

Preliminary reading, called scouting or rapid investigation, is done with the object of ascertaining whether the reference has any bearing on the topic under study. For this purpose one is guided by the table of contents, index, chapter headings and illustrations. In case these sources fail to give necessary information, one has to resort to *skimming*. The quickest and most effective way of skimming through some material is to read the first and the last lines of a paragraph and evaluate rapidly what is contained in it.

Critical Reading

As a result of preliminary reading, a note can be made of suitable reference materials intended for thoughtful reading which involves reflective thinking and serious evaluation. It is on the basis of this that references found useful are to be listed in a bibliography.

Compiling a Bibliography

One of the fundamental activities connected with any scientific investigation, compilation of a good bibliography, means that

(i) it should be accurate in every detail,
(ii) it should be complete but not padded,
(iii) it should be consistent in form, *i.e.* it should follow a uniform classification.

The following should appear in each complete bibliographical item :

(*i*) the author's name—arranged thus : last name—first name—middle name,

(*ii*) the title, given in full as it appears on the title page of the publication,

(*iii*) Additional data : *(a) of books*—name of series and Vol. No. (if in series), place of publication, name of publisher, copyright date of edition and number of pages *(b) of periodicals*—name, Volume and Number, month and year of publication.

Note-taking

It is an extremely important research activity to collect materials in a form that can be easily recalled and used in the future. There are various ways of note-taking used by students and research workers. The most common ones are :

(*i*) Using the publication itself by writing in the margin and by underlining words, phrases, sentences or paragraphs,

(*ii*) Using note-books or loose sheets for taking down significant points and quotations.

(*iii*) Using the card-system for the purpose.

The *criteria* considered important for good note-taking are :

(*i*) Convenience or ease of handling,

(*ii*) Flexibility,

(*iii*) Uniformity,

(*iv*) Accuracy and fitness of data, and

(*v*) Ease of assembling.

The *common errors* observed in note-taking which a researcher should guard against, are :

(*i*) Failure to provide for systematic organization of material, which results in much duplication of effort when material is required in usable form.

(*ii*) Lack of bibliographical reference resulting in waste of time if the reference has to be located again or if the bibliographical note has to be given in the report.

It may be helpful to classify notes in four categories :

(*i*) Quotation,

(*ii*) Paraphrase,
(*iii*) Summary, and
(*iv*) Evaluation.

An effective method of note-taking is the one which is based not only on skimming, but in which the source is skimmed through before taking down any notes, and thus the most significant material is selected. One would benefit by following the advice given below in this connection :

(*i*) Use cards or slips of paper instead of notebooks or foolscap sheets. 4" × 6" is a convenient size to carry and easy to arrange topic-wise.
(*ii*) File each note-card under a definite topic or heading marked at the top of the card. At the bottom of the card note down complete bibliographical reference.
(*iii*) Include only one topic on one card. Organization of notes will thus be flexible. In case notes are lengthy use more than one card, consecutively numbered and pin or tag them together.
(*iv*) Notes must be complete and clearly understandable.
(*v*) Distinguish clearly between a summary, a direct quotation, a reference to the author's source and an evaluative statement.
(*vi*) Don't plan to recopy or type your notes. Copy the notes correctly the first time.
(*vii*) Keep the notes carefully filed lest they get lost or misplaced.

SUMMARY

1. The availability and utilization of adequate sources of related information, both are essential for a proper research activity.
2. Survey of related literature does not only form one of the early chapters of the thesis, but also serves other useful purposes.
3. Sources of information may broadly be divided into direct and indirect sources. *Direct sources* consist of periodical literature, books, monographs, yearbooks and bulletins, etc. dissertations and theses, and government publications, etc. *Indirect sources* include encyclopaedias, indexes, abstracts,

bibliographies, etc.

4. Among foreign encyclopaedias of education, Walter S. Monroe's *Encyclopaedia of Educational Research* holds the pride of place. Henry D. Rivlin and H. Schueller's *Encyclopaedia of Modern Education* is also a comprehensive work. No educational encyclopaedia has yet been prepared in our country.
5. The American *Education Index* and the *Index to Selected British Educational Periodicals* are the major foreign indexes of Education. In India, *Indian Education Index* is being issued by the C. S. E. L. every month for some time now.
6. Among outstanding education abstracts America has *Review of Educational Research, Education Digest* and *Dissertation Abstracts* (in microfilm form). *Indian Education Abstracts* is issued every three months since 1955. Basic Education Abstracts are also useful periodical guides. Some minor but important abstracts are available through the institutions that carry on research in education. Some International abstracts (*Foreign Education Digest* and *Education Abstracts*) are published regularly.
7. Systematic and regular bibliographies and directories, such as are available in U. S. A. and U. K., are hard to find in India. The Inter-University Board of India and the Ministry of Education are trying to fill the gap in this respect.
8. Among the direct sources of educational literature stands periodical literature found in journals—general and specific. The journals on special aspects of education may be classified into educational research, primary, secondary, vocational and technical and special education; adult education, fundamental education, audio-visual education and special subjects. Current in our country are periodicals, old and new, general and specific, dealing with different aspects of education.
9. Books on methodology of educational research are essential reference sources for investigators. Foreign in their origin, as all available books so far are, they help the Indian research worker but partially.
10. Monographs, yearbooks and bulletins issued by various

agencies in U. S. A. and U. K., and also by some international agencies, supply useful data to the educational researcher. Survey reports of an official nature are available on state, national, as well as international levels.

11. Once adequate sources of information are secured, the researcher has to get engaged in collecting useful material for his purpose. Preliminary reading, critical reading, compiling a bibliography and note-taking are important steps which have to be very carefully undertaken to get maximum utility out of the whole process of surveying related information.

QUESTIONS AND PROBLEMS

1. Why is it essential for an educational research worker to possess an up-to-date information about what has already been thought and done in the field he intends to take up a problem from ? Discuss fully mentioning the difficulties he may come across in the process of acquiring necessary information.
2. Specify in some detail what library sources you would like to refer to in working out a reasonably complete bibliography for the purpose of a preliminary survey of literature in connection with the problem of educational research you have chosen.
3. Select any broad field of Indian education and locate as many references as you can, from the education indexes available in India, which have a direct bearing on the subject chosen. Arrange your selected references in proper alphabetic order.
4. Work out a brief working bibliography on the particular topic you have selected for research, stressing the literature of the two immediately preceding years.

SELECTED REFERENCES

Best, John W., *Research in Education*, U.S.A.: Prentice-Hall, Inc. Engle Wood Cliffs, 1959. 320 pp. Read Chap. 3, pp. 31-83.

Cole, Arthur H., Karl W. Bigelow, *A Manual of Thesis Writing*. New York : John Wiley and Sons, Inc., 1951. 51 pp. Read pp. 4-16.

Good, Carter V., *Introduction to Educational Research*, U.S.A. : Appleton Century Crofts, Inc., 1959. 424 pp. Read Chap. III, pp. 93-110.

Good Carter V., A. S. Barr and Douglas E. Scates, *Methodology of Educational Research*. New York : Appleton Century Crofts, Inc. 1941. 890 pp. Read Chap. III, pp. 104-184.

Goode, William J., Paul K. Hatt, *Methods in Social Research*. New York : McGraw Hill Co., Inc., 1952. 386 pp. Read Chap. 9, pp. 102-118.

Pugh, Griffith Thomson, *Guide to Research Writing*. U.S.A. : Houghton Miffin Co., 1955. 62 pp. Read Chap. III & IV, pp. 7-30.

Smith, Henry Lester, *Educational Research, Principles and Practice*. Bloomington : Educational Publications, 1944. 249 pp. Read Chap. IV, pp. 62-80.

Whitney, F.L., *The Elements of Research*. New York : Prentice-Hall, Inc., 1956. 539 pp. Read Chap. IV, pp. 97-108.

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25/3, B. C. Road

CHAPTER SIX

Procedure in Educational Research—C
Tools of Research and Collection of Data

Need for suitable instruments to collect new data. Variety of tools. Major tools of research—Inquiry Forms, Observation, Interview, Social Measures and Psychological Tests. Inquiry Forms—Questionnaire : characteristics of a good questionnaire, useful hints for construction of a questionnaire ; questions the investigator should ask regarding the use of the questionnaire ; some practical hints on the administration of questionnaires ; analysing and interpreting questionnaire responses. Schedule : definition and uses. Check List : useful hints for constructing a check-list ; analysis and interpretation of check-list data. Rating Scale; forms and uses ; useful hints on the construction and use of rating scales ; difficulties in constructing and using rating scales. Score card: uses, difficulties. Opinionnaire or Attitude Scales: definition and uses; Thurstone and Lickert techniques; hints on making opinionnaire items; limitations of attitude scales. Observation: uses; types; requisites of good observation (planning, execution, recording and interpreting). Interview: value and uses; classification of types of interview (diagnostic, clinical and research; individual and group; single interviewer and panel interviews; non-directive, focused and depth interviews; requisites of a good interview (proper preparation, skilful execution, adequate recording and interpretation); limitations of interview. Social measures—social distance scales; guess-who technique ; sociometry (sociometric matrix and sociogram). Psychological Tests—Achievement Tests: uses; types; characteristics. Intelligence Tests: purpose; classification; characteristics. Aptitude Tests; purpose and uses. Interest Inventories : uses; description; types. Personality measures : purposes ; types (direct and indirect or inventories and projective techniques).

Factual material or data unknown or untapped so far is essential in every study. They can be obtained from many sources, direct or indirect. It is necessary to adopt or evolve a systematic procedure to collect essential data. Relevant data, adequate in quantity and quality should be collected. They should be sufficient, reliable and valid.

For collecting new, unknown data required for the study of any problem one may use various devices. For each and every type of research we need certain instruments to gather new facts

or to explore new fields. The instruments thus employed as means are called *tools*. The selection of suitable instruments or tools is of vital importance for successful research. Different tools are suitable for collecting various kinds of information for various purposes. The research worker may use one or more of these tools in combination for his purpose. Research students should familiarize themselves with the nature, merits and limitations of these tools and should also attempt to learn how to construct and use them effectively.

The major tools of research in education can be classified broadly into the following categories :

A. Inquiry Forms :
   1. Questionnaire
   2. Schedule
   3. Check-List
   4. Rating Scale
   5. Score Card
   6. Opinionnaire or Attitude Scale.

B. Observation
C. Interview
D. Sociometry
E. Psychological Tests:
   1. Achievement Test
   2. Aptitude Test
   3. Intelligence Test
   4. Interest Inventory
   5. Personality Measures.

Inquiry Forms

Inquiry forms are a class of data-gathering devices which make use of properly prepared proformas or forms for inquiring into and securing information about certain phenomena under study. Out of a number of such inquiry forms, perhaps the most used and the most abused of tools is the Questionnaire. Let us consider this tool in detail before we discuss the other tools.

1. *Questionnaire*

"In general the word questionnaire refers to a device for securing answers to questions by using a form which the respon-

dent fills in himself."—Goode and Hatt.[1]

Barr, Davis and Johnson define questionnaire as "a systematic compilation of questions that are submitted to a sampling of population from which information is desired."[2]

The apparent ease of planning and using a questionnaire tend to make it appealing to novices in research. Often referred to as 'the lazy man's way of gaining information', questionnaire is yet the most flexible of tools which possesses unique advantages over other kinds of tools in collecting both quantitative and qualitative information. Careful preparation of a good questionnaire, however, takes a great deal of time, ingenuity and hard work. Usually the questionnaires sent out by the fresh research workers suffer from certain errors with the result that the reaction to questionnaires is often unfavourable and response is slow, scanty and frequently disappointing, providing a very flimsy basis for generalization. The *common errors* observed in questionnaires are:

(*i*) Questionnaires are very often too lengthy;
(*ii*) the subject is of trivial importance;
(*iii*) the items are vaguely worded or improperly arranged; and
(*iv*) the form is poorly organized.

Characteristics of a good Questionnaire.[3]

1. A good questionnaire deals with a significant topic and it is so considered by the respondent. The questionnaire itself or the forwarding letter must indicate its importance.
2. It seeks information which is not obtainable from other sources (like school reports or census data, etc.)
3. It is as short as possible, though comprehensive and clear enough for securing all the essential information.
4. It is attractive in appearance, neatly arranged and clearly duplicated or printed.
5. It contains directions which are clear and complete. Important items are defined and each question deals with

[1] *Methods of Social Research.* New York : Mc Graw Hill Book Co., Inc. 1952. p. 33.
[2] *Educational Research and Appraisal.* U. S. A.: J. B. Lippincott Co., 1953. p. 65.
[3] John W. Best, *op. cit.*

a single idea in unambiguous terms. As such, it is valid and reliable.

6. Items are arranged in categories to ensure easy and accurate responses.
7. It contains questions of an objective nature without any leading suggestions as to the responses desired.
8. It presents questions in a good order, proceeding from general to the more specific responses, from simple to complex, from those that will create a favourable attitude to those that may be somewhat delicate or intimate.
9. It avoids annoying or embarrassing questions.
10. It is easy to tabulate and interpret, based on a preconstructed tabulation sheet and a visualized final analysis of data.

Useful hints for Construction of a Questionnaire

1. Study other questionnaires, and keep in mind the characteristics of a good questionnaire.
2. Get all the help you can and make all preparation for planning and constructing your questionnaire.
3. Submit your questionnaire items for criticizm to your friends and colleagues.
4. Try your questionnaire on a few friends and acquaintances. Items that seem perfectly clear to you may turn out to be ambiguous. Improve them so that the questions are clear and unambiguous and fit to draw the desired information from the respondents.
5. Remember that a questionnaire may contain two kinds of items:
   (a) the closed form, and
   (b) the open-end or unrestricted form.

The closed form requires short, check responses or provides for making just a 'yes' or 'no', a short response, or just a check from a list of suggested responses. Items of this type are entirely satisfactory for certain kinds of information. The main advantages of closed form items are:

(i) They are easy to respond to;
(ii) they take little time:
(iii) they keep the respondent on the subject ;
(iv) they are relatively objective; and

(v) they are fairly easy to tabulate and analyse.

But in using these items one should remember that the completeness of the original list of responses is specially important. It is advisable, however, to provide for unanticipated responses by allowing an 'open' category of response with a request—'kindly specify' or 'please mention'—to enable the tabulator to classify such responses. Opportunity should be given to the respondent to include supplementary or explanatory information.

The open end or unrestricted type of items otherwise known as *free-response* or *unstructured* form call for a free response in the respondent's own words. No clues are provided. They provide for greater depth of response and go down into the area of hidden motives that lie behind attitudes, interests preferences and decisions. These items are objective as the respondents reveal their own frames of reference rather than the researcher's. But the responses to such items are sometimes difficult to interpret, tabulate and summarize in a research report.

Each type of these items has its merits and limitations and the questionnaire framer must decide which type is more likely to supply the information required. Many questionnaires include both the open and the closed type items in combination. The appropriateness of the recall and recognition items for eliciting different kinds of information should be determined.

6. There are no specific ways of producing fool-proof questions—but there certainly are *principles* that might be employed to make the items more precise. According to J. W. Best, following are *the principles of making items more precise :*

(*i*) *Define or qualify terms that could easily be misinterpreted.* For example, the term 'value' in a question—'What is the value of your house ?'—may connote different things to different respondents. Make the question specific, *e.g.* 'What is the present market value of your house? Such common words like 'age', 'curriculum', 'progressive education' and 'democracy' are all liable to be interpreted in various ways—even 'how much' and 'now'. To the question—'What work are you engaged in

now ?'—the respondent may be tempted to answer—'filling out your silly questionnaire.'

(*ii*) *Be careful in using descriptive adjectives and adverbs with no definite agreed upon meaning.* 'Frequently'. 'occasionally', 'rarely, etc. may mean different things to different persons or in different contexts. Perhaps a stated frequency—how many times per week, month or year—would make a classification more precise.

(*iii*) *Beware of double negatives.* The use of double negatives in questions like the following is definitely misleading :

(*a*) Are you opposed to not requiring students to take showers after physical training?

(*b*) Central Government aid should not be granted to those states in which education opportunities are not equal, regardless of race, creed and colour.

(*iv*) *Be careful of inadequate alternatives.* For example, in the item—'Married? Yes. No.'—does the question refer to present or former marital status? How would the person who is widowed or separated or divorced answer such a question?

(*v*) *Avoid double-barrelled questions. Divide them into two.* For example, 'Do you believe that gifted students should be placed in separate groups for instructional purposes and assigned to special schools?'

(*vi*) *Underline a word if you wish to indicate special emphasis.* For example, 'Should all schools offer a modern foreign language'—will bring forth the desired responses more easily than if the word modern was not emphasized by underlining.

(*vii*) *When asking for ratings or comparisons a point of reference is necessary.* For example,—'How would you rate this student-teacher's classroom teaching ?'—'Superior', 'Average', 'Below Average' is vague until the respondent is told with whom to compare—an experienced teacher, other student teachers, or an ideal student teacher.

(*viii*) *Avoid unwarranted assumptions.* For example, to the question 'Are you satisfied with the salary raise that you received last year?' a 'no' answer might mean that the respondent did not get any raise, or that he is not satis-

fied with the raise that he got.

(*ix*) *Phrase questions so that they suit all respondents.* An item like 'How many days per week do you send your student-teachers for Practice Teaching?, may not suit all respondents as some training colleges have continuous, some block, and some, a combination of block and continuous teaching practice.

(*x*) *Design questions that will give a complete response.* An item like—'Do you read the Film India? Yes. No., would not reveal much information about the reading habits of the respondent. It should be followed by an additional item.

(*xi*) *Provide for a systematic quantification of responses.* To ask respondents to rank, in order of preference, a specific number of responses from a given list of items permits a convenient way of tabulation by inverse weightings :

I	Choice	5 Points.
II	,,	4 ,,
III	,,	3 ,,
IV	,,	2 ,,
V	,,	1 ,,

The total weighted scores would be the score for the particular item.

(*xii*) Consider the possibility of classifying the responses yourself rather than having the respondent choose categories. The result may not be satisfactory, if, *e.g.* the respondent was asked to indicate his father's occupation in the following categories:

(*a*) unskilled labour,
(*b*) skilled labour,
(*c*) clerical labour,
(*d*) Managerial work,
(*e*) profession,
(*f*) proprietorship.

So, instead, ask questions like:

(*i*) At what place does your father work?
(*ii*) What work does he do?

7. Methods of determining the reliability and validity of

a questionnaire are often unwieldly and unsatisfactory. More dependable results are ensured by:

(*i*) minimizing the effect of certain conditions which impair reliability or validity. (Refer to the above principles).

(*ii*) designing the items with a view to quantification of results. It should be possible to translate replies into quantitative expressions of absolute or relative values which may be described by statistical techniques. The plan for quantitative treatment should be sufficiently adequate to permit question-to-question comparison as well as the comparison of the findings of this inquiry with those of other investigations.

8. On the whole, the questionnaire as a research tool should be brief, sharply focused on its specific purpose, and explanatory of what, why, who, for whom and how. It must reveal the following facts:

(*i*) The auspices—who is sanctioning the study?

(*ii*) The purpose—why is the study initiated?

(*iii*) The incentive—why should the respondent bother to answer?

(*iv*) The directions—how to fill it out?

(*v*) The guarantee—of anonymity and secrecy.

9. In preparing directions for answering questions, one should observe the golden mean between extreme completeness and detail on the one hand and extreme incompleteness and vaguenesss on the other. One must work back and forth shuttle-like between the questions and directions as one constructs a questionnaire. The respondent's psychology of motivation to get his attention, interest, sympathy, co-operation and honesty in answering questions should be kept constantly in mind.

Questions the investigator should ask concerning the use of the Questionnaire

1. Is the questionnaire a more appropriate tool than, or as appropriate a tool as, some other data-gathering instruments for the specific problem in hand?
2. Is not the information he requires available through documentary sources or related literature?
3. Does the recipient of the questionnaire have the informa-

tion required and is he free and willing to respond?

Some practical hints on the administration of the Questionnaire

1. Choose respondents carefully—those who possess the required information and are sufficiently interested to respond conscientiously and objectively.
2. For better returns, send the request for getting the responses through the administrative head of an organization. Get the aid of sponsorship of a person, organization or institution of prestige to endorse the project.
3. To induce the respondent for compliance to the request, be sure to include a courteous, carefully constructed cover letter explaining the purpose of the study, and promising a summary of questionnaire results when ready (which promise should be scrupulously honoured). A stamped self-addressed envelope should be invariably enclosed.
4. Consider the possibility of anonymous responses in case the desired information is delicate or intimate in nature. An anonymous instrument is most likely to produce objective and reliable responses. Even if the respondent's name is necessary for purposes of classification, the respondent could be assured that his responses will be kept strictly confidential.
5. A vigorous follow-up procedure may be necessary to expedite the return of Questionnaires. A courteous reminder by a post card, personal letter, a phone call or personal visit may be necessary.
6. It is difficult to estimate in the abstract what percentage of responses can be considered adequate for an investigation. The importance of the project, the quality of the questionnaire, the nature of the group of respondents selected, the time of the year and many other factors determine the proportion of responses, that could be considered adequate.

Analysing and Interpreting Questionnaire Responses

Quantification of data obtained by the questionnaire is generally achieved through tabulation and counting. Refinement of results in tabular form in totals, percentages or averages

(means, medians or modes) is invariably required. Calculation of coefficients of correlation is often made in order to suggest probability of relationship among data. Frequency tables are made of short answers in terms of units of time, age, sex, groups and practice, etc. The data are expressed quantitatively on the basis of the number of persons whose replies are tabulated under the several categories of the questionnaire. Independent categories of information, however, are necessary for extensive treatment of results.

Numerical answers to the same question by different respondents can be added and averaged. But they can seldom be combined with answers to any other questions. Comparison of averages from question to question can, however, be made.

Narrative data on questions are often hard to analyse. Information embedded in descriptions has to be dug out and recorded as brief notes. Such responses can be categorized and tabulated. This process needs considerable judgment and is often tedious.

The interpretation of the data analysed and the formulation of conclusions should take into consideration the percentage of responses secured to the questionnaires administered, as generally the smaller the percentage of responses, the lesser the reliability of the data collected. The report of the investigation should thus invariably include this percentage.

2. *Schedule*

> Schedule is the name usually applied to a set of questions which are asked and filled in by an interviewer in a face to face situation with another person.[4]

A schedule is different from a questionnaire in that the former is administered personally to a respondent or a group of respondents while the latter is usually mailed. The advantages this tool has over the questionnaire are that it provides opportunity to establish rapport, to explain the purpose and to make the meaning of items clear. It also economises time and expense and provides complete and usable returns. But it suffers from some handicaps too. It may not be possible to contact personally all the respondents required, either individually or in a group. Sometimes, although personal contact

[4] Goode & Hatt, op. cit., p. 133.

may be possible, yet it may prove to be too expensive or time-consuming.

The substitutes that can safely be used in place of the schedule are the mailed questionnaire or check-list.

The characteristics of a good schedule, the ways of constructing a good schedule and the analysis and interpretation of the data gathered through a schedule are not very different from those of a questionnaire. They, therefore, need not be repeated here. Its administration in a face to face situation, to an individual or group, is different from the administration of a questionnaire. But it is so much like the administration of an interview that we shall rather discuss it in connection with the interview procedure than here.

3. *Check List*

The Check-list is a simple laundry-list type of device, consisting of a prepared list of items. It is a type of questionnaire in the form of a set of categories for the respondent to check. It is used to record the presence or absence of the phenomena under study. Responses to the Check-list items are thus a matter of *fact*, not of *judgment*. This tool has the advantage of systematizing and facilitating the recording of observations and of helping to assure the consideration of all important aspects of the object or act observed. The Check List is an important tool in gathering facts for educational surveys. It may also be used as a form of recording in observational studies of behaviour. When used as a sort of scale to yield a score, it is an instrument often used in educational appraisal studies—of school buildings, property, plan, text books, instructional procedures and outcomes, etc.

Useful Hints on Constructing a Check List

1. Examine closely the check-lists prepared and used for purpose of educational research by successful investigators.
2. Read as many descriptions as possible on the construction and use of check-lists in educational research.
3. Determine the items on which you require information for your study and details you need.
4. Arrange the items in categories and the categories in a logical or psychological order. Related items should be

grouped together.

5. Arrange the individual items in an adequate way to secure the information and details you require. Remember that check-list items can be arranged in several ways. Four common styles of arrangement, according to Homer Kempfer, are:[5]

   (*i*) that which asks that all items found in a situation be checked,

   e.g.—Make a check mark (√) in the blank beside each activity undertaken in your school.

   ——Games & Sports
   ——Gardening
   ——Dramatics
   ——Musicals
   ——Debates
   ——N.C.C. Training.

   (*ii*) The form in which questions with a 'yes'/'no' are asked to be encircled, underlined or checked in response to the items given.

   e.g.—Does your school have a Students' Union? Yes/No.
   Do you observe the open shelf library system in your school? ... Yes/No.

   (*iii*) The form in which items are positive statements with checks (√) to be marked in a column on the right.

   e.g.—One half of the girls in the schools belong to scheduled caste ... ... ( )
   The school works as a community centre ... ( )

   (*iv*) The form where items can best be embedded in sentences and the appropriate word checked, underlined or encircled.

   e.g.—The Students' Union organizes activities—weekly, fortnightly, monthly, irregularly.
   The literary club meets for 60/90/120 minutes on 1-2-3-4-5-6-7 days per week.

   Choose the style appropriate to your subject and queries. Make use of all or some of the above forms to serve your purpose best.

[5] Homer Kempfer, "Tools for Evaluation," *Indian Journal of Adult Education*, Vol. XXI, No. 7, July 1960, pp. 13-16.

6. To improve the validity of the check-list phrase the items in such a way that they are discriminative in quality. For this purpose let the items have definitions carefully written in.

   e.g.—instead of just asking 'Does the school have a library?, ask 'Does the school have a library open for at least 4 hours daily with at least one book for every child in the school?'

7. Check Lists must have the quality of completeness and comprehensiveness. A pilot study and survey of previous literature is helpful in this direction.

Analysis and Interpretation of Check List Data

The tabulation and quantification of check-list data is done in very much the same way as of the questionnaire responses. Frequencies are counted, percentages and averages calculated, means, medians and coefficients of correlation computed as and when required. Sometimes, in long check lists where related items are grouped together, the checks are added up to give total scores for the categories in question. Such total scores for different categories can be compared between themselves or with similar scores secured through other studies.

The conclusions based on the findings of check list data must be arrived at carefully and judiciously keeping in view the limitations of the tool as well as those of the respondents.

4. *Rating Scale*

Rating is a term applied to expression of opinion or judgment regarding some situation, object or character. Opinions are usually expressed on a scale of values. Rating techniques are devices by which such judgments may be quantified.[6]

The rating scale is a very useful device in assessing quality—specially when quality is difficult to measure objectively. For example, 'How good was the performance?' is a question which can hardly be answered objectively.

Rating scales record *judgments* or *opinions* and indicate the *degree* or *amount*. Descriptions of different degrees of quality

[6] A. S. Barr, Robert A. Davis & Palmer Johnson, *op. cit.*, p. 74.

are arranged along a line from high to low or otherwise, and this line is the scale.

e.g.—How good was the performance?

Excellent	V. Good	Good	Average	Below Average	Poor	V. Poor.

This most commonly used instrument for making appraisals has a large variety of forms and uses. Typically, they direct attention to a number of aspects or traits of the thing to be rated, and provide a scale for assigning values to each of the aspects selected. They try to measure the nature or degree of certain aspects or characteristics of a person or phenomenon through the use of a series of numbers, qualitative terms, named attributes or verbal descriptions. Rating scales have been successfuly utilized for the purposes of—

(*i*) Teacher rating—for selection, evaluation and prediction;

(*ii*) Personality rating—for various purposes;

(*iii*) Testing the validity of many objective instruments like paper-pencil inventories of personality;

(*iv*) School appraisal—including appraisal of courses, practices and programmes.

Making use of rating scales is a very flexible and simple procedure but it depends on judges instead of independent criteria and is thus not wholly objective.

Useful hints on the construction and use of Rating Scales

1. Rating scales include three factors :
   (*i*) the subjects or the phenomena to be rated,
   (*ii*) the continuum along which they will be rated, and
   (*iii*) the judges who will do the rating.
   All these three factors must be very carefully selected.
2. The subjects or phenomena to be rated are usually a limited number of aspects of a thing, or of traits of a person. Only the most significant aspects for the purpose of the study should be chosen.
3. (*a*) The usual way to get qualitative-cum-quantitative judgments on the selected aspects of a thing or person is to set up five to seven categories in such terms

as :

Superior	Above Average	Average	Fair	Inferior
Excellent	Good	Average	Below Average	Poor
Always	Frequently	Occasionally	Rarely	Never

(*b*) Another procedure, however, establishes position in term of specific behavioural or situational descriptions, *e.g.*, instead of deciding whether the individual's leadership qualities are superior or above average, it may be easier to decide between: 'Always exerts strong influence on his associates',

and 'Sometimes is able to move others to action'.

One may with advantage consider the use of the latter form too.

4. The different degrees of quality are usually adjectives or descriptions. Their meaning should be clearly different from each other, and in going 'up' the scale one should feel that the next description represents better quality than the last. In writing and arranging these descriptions it is good to have the judgment and agreement of several people.
5. Items may be arranged in ascending or descending order from *left to right*. An odd number of steps should be used and the average or usual quality should be kept in the middle.
6. At least three divisions of quality must be kept. (A two division rating scale—'Yes/No', Bad/Good', — forms a check-list.) A rating scale may have as many divisions as can be readily distinguished by the raters. Practically, most scales have no more than seven divisions. Usually they contain five divisions. By numbering each division in sequence the descriptions can be converted into arithmetic values for averaging.
7. The rating scale is always composed of two parts—(*i*) an instruction which names the subject and defines the continuum and (*ii*) a scale which defines the points to be used in rating.

According to Homer Kempfer, one can arrange the rating

scales in four ways :

(*i*) On a straight line, *e.g.*

V. Good — Good — Average — Poor — V. Poor,

The rater records his judgment along the top of the line by marking an X or √ at the appropriate place.

(*ii*) Ratings may be arranged one after the other on a line so that all are visible at a glance.

e.g.—How valuable were the idea contributed by—

	No Value	Some Value	Average Value	Superior Value	Highest Value
A					
B					
C					

or, ratings may be marked in a column at the right—

e.g.—Express your opinion by encircling the proper letters—VC (very clean). C (clean), D(dirty), VD (very dirty)

	VC	C	D	VD
The school compound was				
The class rooms were				
The children were				

(*iii*) The scale can run down the page and look much like a check list, *e.g.*—

For me the idea content of the lecture—

——was entirely over my head.
——was difficult to understand.
——was reasonably understandable.
——was clearly understandable.
——contained nothing new.

(*iv*) The scale may call for ranking, *e.g.*—

(*a*) Which instructors helped you most? Rank them by number from most (1), next most (2), onto least (5).

Kishan ... 5

Mukerji ... 4
Rao ... 2
Ram Lal ... 1
Singh ... 3

(*b*) Rank these solutions (W, X, Y, Z) of the problem in order of merit—starting with 1 for best.

3 W 2 X 4 Y 1 Z

This type of *ranking* is a higher form of rating whereby individuals or phenomena are arranged in order of merit, *i.e.* they are given positions determined by their relation to the others in the group, not by certain predetermined standards. It is a superior device because the comparisons must be close. But it cannot be used well when large numbers are concerned.

The investigator must arrange his items in any or all of the above forms according to the nature of the item and its purpose.

8. Any one can serve as a rater where non-technical opinions, likes and dislikes and matters of easy observation are to be rated. But only well-informed and experienced persons should be selected for rating where technical competence is required. So an educational investigator should employ only those persons as raters who are either experts in the field or who form a sample of the population in which the scale will subsequently be applied.
9. Pooled judgments increase the reliability of any rating scale. Employ several judges, depending on the rating situation, to obtain desirable reliability. Individual ratings when combined into a final rating give a safer assessment. For this, supply a separate copy of the scale to each rater to mark his judgment on, independently, to avoid the possibility of contamination of judgment otherwise. Tally the marks on a single copy. (If eight raters were employed, their ratings could be tabulated and quantified thus :

1	2	3	4	5
×	×	××	×××	×

Effect the quantification of ratings by transmuting letter designations, or verbal characterizations, into numbers and by computing a total score.

10. A single rating index can be calculated by adding the numbers in the above example (1,2,3,3,4,4,4,5) and dividing the total by the number of ratings (8). The average rating index thus is 3.25.
11. One rating index can be compared with results of other ratings using the same scale if it serves some logical purpose.

Difficulties in constructing and using Rating Scales

1. It is difficult to convey to the rater just what quality one wishes him to evaluate. An adjective or adverb may have no universal meaning. Brief behavioural statements or situational descriptions which have clear objective connotations should be used in place of vague terms.
2. It is difficult for raters to get rid of the halo effect which causes a rater to carry qualitative judgment from one aspect to another. For example, one tends to rate a person with a pleasing personality high on traits like intelligence or professional interest too. Halo effect appears frequently when the rater has to rate a number of factors on some of which he has no evidence for judgment. It is advisable to keep at a minimum the number of essential characteristics to be rated. Otherwise, it should be provided to the raters to omit rating characteristics that they have had no opportunity to observe.
3. Raters tend to be generally generous. It has been verified that 60% to 80% of an unselected group tend to receive above-average ratings in all traits. The raters are inclined to be unduly generous in rating aspects which they have had no opportunity to observe.
4. Although pooled judgments of many raters reduce subjectivity of individual judgments, yet the averages of scores thus arrived at are by no means either totally objective or highly valid. In interpreting the rating indices, due allowance has to be made of this factor.

5. *Score Card*

The Score Card is an elaborate form of Rating Scale in which items are always evaluated, usually in numerical terms. Sometimes the two terms—score card and rating scale—are

used almost interchangeably. The score card provides for the appraisal of a relatively large number of aspects. Its ratings usually yield a total weighted score and thus reach an over-all evaluation.

Score Cards are frequently used in evaluating communities, building-sites, schools, text-books, socio-economic status of a family and the worth of any literary or educational work or institution. The rater is provided with a general standard of criteria in detail and he has to react to and rate only a single unit of the total situation at a time. Usually a number of raters are employed and their scores combined and averaged.

Score cards as tools of research and evaluation suffer from some limitations and difficulties which are similar to those of the rating scales. The difficulty of choosing, indentifying and quantifying the significant aspects of the factors to be observed are real. But more important than these is the suspicion that the whole of a thing may be greater than the sum of its parts. Certain intangibles never lend themselves to score-card ratings.

The characteristics of a satisfactory score-card, and the best techniques for constructing one must vary with the field and purpose of the evaluation or research in hand.

6. Opinionnaire or Attitude Scale

Measurement and description of opinions and attitudes is an interesting area of research where data is collected in the form of expressed opinion of individuals. To obtain the measure of the attitude or belief of an individual or a group of individuals towards some phenomenon the inquiry form called *opinionnaire* or *attitude scale* is used. *Opnion* and *attitude* are allied but not synonymous terms. *Attitude* denotes the inner feeling or belief of a person towards a particular phenomenon. It is very difficult, if not impossible, to measure it. *Opinion* is what a person says about his attitude towards some phenomenon. The only means of inferring or estimating a person's attitude or belief is a sample of his expressed opinion secured in answer to a questionnaire or reactions to certain statements. This process of inferring attitude from expressed opinion is obviously subject to many limitations. Real attitude may be easily concealed and socially acceptable opinions expressed. The person concerned

may not be clearly aware of his real attitude himself. He may have never considered it at all, or may never have been confronted with a real situation to discover what his attitude towards a specific phenomenon is. Attitudes are revealed in the overt behaviour of an individual. But 'observation of behaviour' as a means of inferring attitude of a person too is also not totally valid. Behaviour also does not always indicate attitude truthfully. Kissing or petting of children by a teacher in the presence of an inspector may not prove that she has a loving attitude towards children. Social customs and values make many kinds of behaviour mere formalities quite unrelated or even opposite to the inward feelings of the individual. Moreover, observation of behaviour may not always be possible with a large sample under study.

Under the assumption that description and measurement of opinion is closely related to the real feelings or attitude of an individual some methods have been devised and used to measure attitudes. Several methods employed in this area are:

(*i*) Asking the individual directly how he feels about a subject through the use of a schedule, questionnaire or interview.

(*ii*) Asking the individual to check the statements in a list with which he is in agreement.

(*iii*) Asking the individual to indicate the degree of his agreement or disagreement with a series of statements about a controversial subject.

(*iv*) Inferring an individual's attitude from his reaction to projective devices through which he may reveal his attitude unconsciously.

When questionnaire, schedule or interview is used for evaluation of attitude, lists of operational statements are assembled and the individual is asked to record his probable reaction towards the various types of behaviour proposed. Each statement shows either a favourable or an unfavourable attitude. In order to increase the discrimination value of these tools, it is usually provided for the individual to qualify his responses. Indirect methods of evaluating attitude tend, however, to be more accurate than direct methods in determining the direction and intensity of an attitude. Techniques which disguise the

attitude object and thus elicit spontaneous reactions are preferable to direct questions.

Two popular and useful methods of measuring attitudes indirectly, commonly used for research purposes, are the *Thurstone Technique of Scaled Values* and *Likert's Method of Summated Ratings*. A brief description of these is given below :

Thrustone Technique of Scaled Values: To measure the attitude of an individual towards a group, institution, idea or practice, a number of statements (twenty or more) expressing different points of view about the subject in question are assembled. They are submitted to a panel of fifty or more judges who are asked to arrange them in eleven groups—ranging from one extreme to another in position. Those items which bring out a marked disagreement between the judges in assigning a position are discarded. From the sorting by each judge of the items retained a composite position for each statement is calculated. The median scale value for each statement, thus calculated on the basis of the panal judgment, falls between 1 and 11. The list of statements is then ready to be given to the subjects who are asked to check the statements with which they are in agreement. This response is quantified on the basis of the median value of the statements.

Likert Method of Summated Ratings: This device of attitude measurement is carried out without the panel of judges necessary for the Thurstone Scale but yields scores very similar to those obtained by the latter. The coefficient of correlation between the two scales is reported to be as high as .92 in one study.

The first step in the construction of this tool is the collection of a number of statements about the subject in question. Statements may or may not be correct but they must be representative of opinion held by a substantial number of people. They must express definite favourableness or unfavourableness to a particular point of view. The number of favourable and unfavourable statements should be approximately equal. To test the internal consistency of the assembled items a trial test should be administered to a small group and the items found ambiguous should be rejected.

The analysis of responses received to the list of statements

can take several forms:

(*i*) the simplest way is to describe but not measure opinion by indicating the percentage of responses on each item.

(*ii*) the actual Likert Scaling Technique provides a 5 point scale and assigns each of the five positions a scale value. All favourable statements are scored from maximum to minimum as 5, 4, 3, 2, 1, and all unfavourable statements from maximum to minimum as 1, 2, 3, 4, 5. The five positions represent from maximum to minimum the following measures: (*i*) *Agree,* (*ii*) *Tend to agree,* (*iii*) *Cannot say,* (*iv*) *Tend to disagree, and* (*v*) *Disagree.*

The total scores obtained on all the items measure a respondent's favourableness towards the subject in question. If an opinionnaire consists of 30 items, the following score values would be revealing:

$30 \times 5 = 150$ Most favourable responses possible.
$30 \times 3 = 90$ A neutral attitude.
$30 \times 1 = 30$ Most unfavourable attitude.

The scores of any individual would fall between 30 and 150. Scores above 90 will indicate a favourable, and scores below 90 an unfavourable, attitude.

Some Hints on making Opinionnaire Items

1. Study the lists of statements prepared and used for measuring attitude by investigators in related areas of research.
2. Survey widely available literature on the subject.
3. Meet and talk to various individuals on the subject. Make them express their ideas on the subject orally or in writing.
4. Collect statements, both favourable and unfavourable, from the above three sources rather than inventing them yourself.
5. Collect a larger number of statements than you need for your scale. Select the statements
   (*a*) which present as wide a variety of situations as possible;
   (*b*) which prevent the individual from detecting the nature of the attitude which is being evaluated;
   (*c*) which do not mention the attitude object or even any

stereotype associated with it, as antagonisms or prejudices are aroused by mention of such terms as Socialism, Fascism, Reds and Prohibitionists, etc.;

(*d*) which have proved to be unambiguous in their meaning through a pilot study.

6. Arrange the statements in a random order irrespective of their favourable or unfavourable indications.
7. Keep the number of favourable and unfavourable statements approximately equal.

Some limitations of Attitude Scales

Attitude scales are not exact in so much as—

1. There is no basis for believing that the five positions indicated in the Likert Scale, e.g. are equally spaced.
2. It is unlikely that the statements are of equal value in 'forness' or 'againstness'.
3. It is doubtful whether equal scores obtained by several individuals would indicate equal favourableness towards a given position. Different combinations of positions can yield equal score values without necessarily indicating equivalent positions of attitude or opinion.
4. It is unlikely that a respondent can validly react to a short statement on a printed form in the absence of real life-qualifying situations.
5. Inspite of anonymity of response, individuals tend to respond according to what they *should* feel rather than what they *really* feel.

However, until more precise measures are developed, the attitude scales or opinionnaires remain the best devices for the purpose of measuring attitudes and beliefs in social research. They determine the direction and intensity of a person's feelings for or against some belief or practice. They are used to measure any changes in attitude which may result from factor introduced purposely or occurring independently.

Observation

Observation as a tool of research deals with the overt behaviour of persons in appropriate situations controlled or uncontrolled. It is concerned, as a rule, with neither what a respondent places on paper, nor with what he says in an interview. It is not haphazard or unplanned. As a research technique it

must always be expert, purposive, systematic, carefully focused and thoroughly recorded. It should be accurate, valid and reliable. For accuracy in measuring and recording, tools such as check-list and score-card or some other inquiry form are utilized along with camera and tape-recorder and measuring instruments like thermometer, stethescope, audiometer, stop-watch, binoculars, etc. Reliability of observation increases if observation is repeated by the same individual or by simultaneous observation done by many individuals. Validity increases by keeping the setting as natural as possible and not letting the subjects to be unduly influenced by the presence of the observer or by his measuring or recording devices. Direct observation, as a research tool, has developed during the present century due to the development of research in child growth and due to the limitations of interview, paper and pencil tests or laboratory techniques.

Uses and advantages

1. Observation as a research technique is being refined and made exact to an extent that it is likely to make an important contribution in descriptive research.
2. Significant aspects of personality which express themselves in behaviour can be best studied directly through observation rather than indirectly through questionnaire and interview.
3. Simple observation of physical aspects of school buildings or students and teachers, etc. is made through physical examination, measurement, assessment and comparison with fixed standards.
4. Observation of physical activities as in games and athletics and in the workshop is made directly very often for coaching purposes.
5. Observation in the classroom is made to analyse learning behaviour which is a more complex phenomenon, and to improve classroom performance. Short, periodic classroom or other observations of pupils' behaviour recorded and filed in the cumulative records of the pupils serve as ancedotal evidence and supply data for research studies.

Types of Observation

Observation may be, broadly speaking, of two types—

(*i*) Participant and (*ii*) Non-participant.

Participant Observation is observation in which the observer becomes more or less one of the group under observation and shares the situation as a visiting stranger, an attentive listener, an eager learner, or as a complete participant-observer, registering, recording and interpreting behaviour of the group. The observer, thus, plays a double role. He gets the feel of what the various processes and activities of a group mean to the members.

This type of observation has certain distinctive advantages over such survey techniques as the questionnaire. It is more reliable, very flexible and extremely searching. It discloses the minute, delicate and hidden facts, usually at lesser expense.

Non-Participant Observation is used with such groups as those of infants, children or abnormal persons. The observer takes a position at a place where his presence is the least disturbing to the group but from where he can observe in detail the behaviour of an individual under observation or some specific characteristics of a small group. It permits the use of recording instruments and the gathering of large quantities of data.

Requisites of Good Observation

As a research tool good observation needs

(*i*) proper planning,
(*ii*) expert execution, and
(*iii*) adequate recording and interpretation.

Planning for Observation

The factors one must consider in detail while planning to employ observation as a research technique are :

(*i*) Definition of specific activities or units of behaviour to be observed.
(*ii*) An appropriate group of subjects to observe.
(*iii*) Scope of observation—individual or group.
(*iv*) Determination of length of each observation period, number of periods and interval between periods.
(*v*) Deciding about the instruments, and the form of recording and physical position of the observer.
(*vi*) Determining the special conditions required for the

subjects.

(*vii*) Preparation of proper tools for recording observations.

(*viii*) Getting oneself trained in terms of expertness as an observer.

Execution of Observation

A good observation plan may not lead to success unless it is followed up with skill and resourcefulness. An expert execution demands :

(*i*) Proper arrangement of special conditions for the subjects.

(*ii*) Assuming the proper physical position for observing.

(*iii*) Focusing attention on the specific activities, or units of behaviour under observation.

(*iv*) Observing discreetly, the length and number of periods and intervals decided upon.

(*v*) Handling well the recording instruments to be used.

(*vi*) Utilizing the training received in terms of expertness.

Recording and Interpreting Observations

The two common procedures for recording observations are :

(*i*) Simultaneous, *i.e.* when the observer goes recording his observations simultaneously with the occurrence of the phenomena observed—as in *time sampling*.

(*ii*) Soon after the observation, *i.e.* when the observer undertakes to record his observations not simultaneously with his actual observation process, but immediately after he has observed for a unit of time, while the details are still fresh in his mind.

Which of the two methods to use must depend on the nature of the group, the type of activities or behaviour to be observed and the skill of the observer. Both the types have their merits and demerits. The simultaneous form of recording observations may distract the subjects, while the other one may fail in being complete and exact.

For a systematic collection of data through observation, the devices of recording often used are :

(*i*) Check Lists,

(*ii*) Rating Scales,

(*iii*) Score Cards,
(*iv*) Scaled Specimens, and
(*v*) Blank Forms for tallying frequencies.

The use of properly constructed proformas of the above-mentioned kinds helps in the summarizing and quantifying of data collected by observation.

Data collected through observation and analysed through the use of proper tools, stands in need of proper interpretation. While interpreting the figures and facts acquired through the observational recording, one should always keep in mind the various limitations of planning, sampling or procedure, the study may have been subject to and thus come to conclusions cautiously and judiciously.

Interview

Interview as a research tool is, in a sense, an oral type of questionnaire or schedule whereby the subject supplies needed information in a face to face relationship. 'The dynamics of interviewing, however, involve much more than an oral questionnaire'.[7] It is based on a process of communication or interaction between the interviewer and the interviewee or respondent. A good interview is based on proper motivation provided by the interviewer to the respondent in the form of achieving some practical ends or some satisfaction in the psychological climate of the interview itself. Interview is relatively more flexible a tool than any written inquiry form and permits of explanation, adjustment and variation according to the situation.

Value and Uses

(*i*) The interview, with skilful interviewers, is much superior to other data-gathering devices because
  (*a*) people are usually more willing to talk than to write, especially on intimate, confidential topics;
  (*b*) the purpose and meaning of questions can be better explained to get valid responses;
  (*c*) the sincerity and insight of the interviewee can be judged through cross-questioning;
  (*d*) a depth and penetration of response can be achieved

[7] Good, Carter V., *op. cit.*, p. 207.

in areas where human motivation is revealed in the reasons for actions, feelings and attitudes concerned;

(*e*) there is no chance for the respondent to edit his earlier answers in the light of later questions and thus disturb the advantage of saliency questions.

(*ii*) It is specially appropriate when dealing with young children, illiterates and those with limited intelligence or in an abnormal state of mind.

(*iii*) Often the interview is used for practical purposes rather than for gathering data for research. It is used, for example, for student counselling, for occupational adjustment, for selection of candidates for education or employment, for psychiatric work, for commercial or social surveys, and for legal proceedings, etc. It is now frequently used as a research tool in historical, experimental, case-clinical and normative studies.

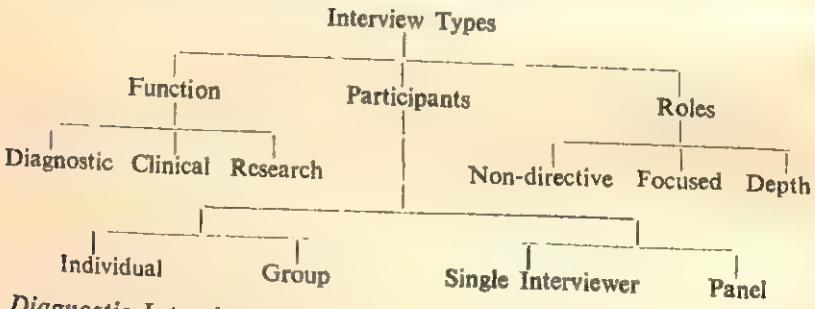
Classification of Types of Interviews

Three main bases of classifying interviews may be distinguished as below :

(*i*) Function of interview,

(*ii*) Number of persons participating, and

(*iii*) Roles assumed by the interviewer and interviewee.



Diagnostic Interview

Used frequently in clinics as well as by social workers it proposes to locate the possible causes of an individual's problems through getting information about his past history, family relations and personal adjustment problems, etc.

Clinical Interview

Following the screening or diagnostic interview, clinical

interview takes place as a means of introducing the patient to therapy. It may take the form of guiding friends and relatives (rather than the patient himself) in their dealings with the patient, or of an exit or termination interview before the patient is discharged from the clinic.

Research Interview

For purposes of research, interview may be used as a tool for gathering data required by the investigator to test his hypothesis or solve his problems of historical, experimental, survey or clinical type.

Individual and Group Interviews

In the past, individual interviews, that is, the practice of interviewing one person at a time, were much more common than the group interviews. These days, however, they are being replaced or supplemented by group interviews. A proper setting for group interview required a group of not more than 10 to 12 persons with some social, intellectual and educational homogeneity which ensures effective participation of all. A circular seating arrangement with the interviewer as one of the group is conducive to full and spontaneous participation of all. Group interview may have an advantage in the range of responses over the individual interview due to the process of group interaction. It may, on the other hand, suffer from certain disadvantages if the group interaction turns into controversies or discussions which are unrelated to the topic, or in which aggressive members monopolize the discussion at the cost of others. The topic may not get fully explored in detail due to certain members hesitating to express significant responses in a quasi-public situation.

Single-Interviewer and Panel Interviews

Both individual and group interviews may be conducted by a single interviewer or a panel of interviewers, according to the design and purpose of the interview. Usually, interviews for selection and treatment purposes are held by a panel of interviewers composed of experts in different but related fields. Interviews for research purposes are usually held by the single investigators. The number of interviewers in a panel should not be more than three to four as a larger panel tends to

scare and confuse the respondents.

Non-directive, Focused and Depth Interviews

In relation to the socio-psychological process of interaction, the interviewer and interviewee may assume different roles to suit the requirements of the interview. *Non-directive, Focused and Depth Interview* are terms used for types of interview which are all unstructured or unrestricted by a definite series of preplanned questions. In these types of interview the subject-matter and field of inquiry are certainly definite and preplanned but the interviewer is largely free to arrange the form and order of questions. The *Non-directive* interview includes questions of the open-end form and permits much freedom to the interviewee to talk freely about the problems under study. Directive approach, on the other hand, is structured and includes questions of the closed type, or suggestive and definite in a prepared order.

The *Focused interview* concentrates on some particular event or experience rather than on general lines of inquiry about it. It aims at determining the responses of individuals to specific communication situations like a movie or a speech. It involves an unstructured form, a non-directive approach, and artistic and emphatic skills. It possesses certain characteristics of the projective technique and observational studies of behaviour as the interviewer very often interprets and appraises the subject's total response to a stimulus situation rather than just his verbal report.

The Depth Interview is an intensive and searching type of interview with emphasis on such psychological and social factors as attitudes, emotions or convictions. It determines the respondent's degree of detachment or attachment towards an experience or activity. It usually involves flexibility of interview situation, focus on feelings and a restatement of implied or expressed feelings.

Requisites of a Good Interview

As a tool of research good interview, like good observation, requires

(*i*) proper preparation,
(*ii*) skilful execution, and

(*iii*) adequate recording and interpretation.

Preparing for Interview

The following factors need to be determined in advance of the actual interview:

(*i*) a clear conception of the purpose and of what information is needed;

(*ii*) The kind of interview (individual, group, non-directive focused or depth) best suited for the purpose;

(*iii*) a clear outline, schedule or checklist of the best sequence of questions and stimulating comments that will systematically bring out the desired information, and

(*iv*) a well thought out plan for recording responses.

Execution of the Interview

(*i*) The initial task of securing the confidence and cooperation of the subject—of building what is called *rapport*-requires an expertness and sensitivity almost amounting to art.

(*ii*) Securing desired information through asking the planned sequence of questions should be done in not too rigid a manner but with stimulating and encouraging comments and necessary explanations and recordings.

(*iii*) The recording device selected should be used without distracting the interviewee.

Recording and Interpreting Responses

(*i*) It is best to employ, if possible, a device of recording which would retain the actual wording of the responses. Tape-recording is convenient and not too expensive if a tape-recorder is available. It permits a complete and objective analysis at a later time by preserving the actual words as well as the tone of voice and emotional impact of the responses.

(*ii*) If the responses to questions in the interview have to be noted down, it can be done either simultaneously with the interview or immediately after it. The former is often found to be of a distracting nature while the latter often fails in being complete in detail. For using either of these devices sucessfully a skilful and practised hand is necessary.

(*iii*) Sometimes, instead of recording responses, the interviewers tend to record their evaluations of them as the interview goes on. It is, however, advisable to interpret and evaluate the responses later, on the basis of the recordings of responses, rather than simultaneously. Hurry and lack of thought can easily distort the process of thorough interpretation required for the purpose.

Limitations of Interview

(*i*) This technique is time-consuming and one of the most difficult ones to employ successfully,

(*ii*) The danger of interviewer bias is constant.

(*iii*) It requires a level of expertness in the interviewer not ordinarily possessed by inexperienced researchers. The objectivity, insight and sensitivity of the interviewer are crucial to any interview.

Social Measures

For the purpose of describing and measuring social relationships, values, or attitudes, etc. many of the tools described above have been variously used. Questionnaire, schedule, opinionnaire, rating scale, observation and interview, all can lend themselves to be utilized for the purpose of collecting data about social phenomena. But some tools which are specifically designed for this purpose are described below :

1. *Social Distance Scales*

Developed by E. S. Bogardus, the technique of social distance scaling attempts to measure the degree to which an individual or group is accepted or rejected by others. The scale consists of a number of scaled situations (usually seven) ranging from acceptance to rejection. The subjects check their positions with regard to persons or groups studied, by choosing the points on the scale with which they feel themselves in agreement. When the scaled situations are weighted, a quantification of the responses received is effected by simple or complex mathematical calculations and comparisons are made as and when necessary.

An example of the kind of scaled situations ranging from acceptance to rejection provided by this tool is given below :

I'd like to have her as my best friend.

I'd like to invite her to my birthday party.
I wouldn't mind going ashopping with her.
I wouldn't like to sit next to her in the class room.
I wish she weren't in my class.

Along such a continuum of social distance, the phenomenon of social acceptability is measured in various contexts—of individuals, groups or abstract values. Not a very refined measure of social phenomena, it is based on two main assumptions :

(*i*) the assumption of equidistance between the scale points ;

(*ii*) the assumption that each point is necessarily beyond the preceding one.

For testing the reliability of this tool the test-retest approach is perhaps the only effective means that can be easily employed. For testing its reliability, one has to take recourse to the *known group method* whereby if the responses of known persons or groups in relation to the social phenomena under study fit the requisite pattern, the scale is considered to be valid.

The use of this method of scaling is generally restricted to pilot studies or to researches which for some reason or the other, need to be completed quickly and do not require a very high degree of accuracy.

2. Guess-Who-Technique

Devised by Hugh Hartshorne and Mark. A. May, the *guess-who-technique* is an interesting tool consisting of descriptions of a series of roles played by individuals in a group. The subjects are to name the individuals who fit the verbal descriptions. Significant peer judgments about individual roles are thus revealed through this process of guessing. Some examples of verbal descriptions provided are :

This person is always happy.
This person is always worried.
This person is always finding fault with others.
This person is always ready to help others.
This person is always active.

3. Sociometry

Designed by J. L. Moreno and Helen Hall Jennings not more than twenty years ago *sociometry* is a measure of social-distance

radically different from the Bogardus approach. It is specially concerned with the phenomena of attractions and repulsions between individuals within a small group and with the structure of a group as defined in these terms. According to Helen Jennings herself

> Stated briefly, sociometry may be described as a means of presenting simply and graphically the entire structure of relations existing at a given time among members of a given group. The major lines of communication, or the pattern of attraction and rejection in its full scope, are made readily comprehensive at a glance."[8]

This tool consists in designating a meaningful *choice situation* e.g. "With whom would you like to work/play/visit, etc.?"—and asking the children to name the person, or persons in order of preference—designating the child they would most like with 1, their second choice with 2, their third choice with 3. In some sociometric studies negatively phrased items are also used. For example, the children are asked, "Whom would you *not* like to work with on a class project?" and they are expected to name the individual, or individuals in order of rejection. Thus, if positive items attempt to describe attractions between individuals by asking them to indicate whom they would choose in a situation, the negative items attempt to describe repulsions between individuals by asking them to indicate whom they would reject in a situation. The data received in response to the choice situations provided is tabulated in the form of a *sociometric matrix* which serves as the basis for analysis.

For an example, if a group of eight children (A, B, C, D, E, F, G, and H) was asked to designate their first, second and third preferences for the children they would like to go to a picnic with, the sociometric matrix could be used for tabulating their responses in the manner illustrated on the opposite page.

Another method of analysis, however, is the one which employs a Chart, the *Sociogram*, to represent in a graphic way the sociometric data. A common form is one in which a choice is represented by a pointed arrow, and a mutual choice by an

[8] Quoted by William J. Goode and Paul K. Hatt, *Methods in Social Research*, p. 249. New York : McGraw Hill Book Co., Inc., 1952.

Chooser \ Chosen	A	B	C	D	E	F	G	H
A		3		1			2	
B			1	2				3
C		1			2			3
D			3		2		1	
E	3		2	1				
F	1		3		2			
G	3			1				2
H	3		2				1	
1st Choice	1	1	1	3			2	
2nd Choice			2	1	3		1	1
3rd Choice	3	1	2					2
Total	4	2	5	4	3		3	3

Fig. 1. Example of a sociometric matrix showing who chooses whom for accompanying to a picnic

arrow pointing in opposite directions. Different symbols (△, ○) may be used for boys and girls, and their identifying initials placed within the symbols. The symbols of those chosen most often (called the *stars*) are placed nearest the centre of the diagram, the ones chosen less often progressively outward. Those not chosen by others (referred to as *isolates*) are literally on the outside. *(Fig. 2.)*

These and other variants of sociometric techniques offer rather simple methods of ranking individuals on a continuum of "acceptability" or "outgoingness" on the part of group members. Where their use is justified they may be powerful research tools, since they meet the general problems of scaling very well.[9]

Sociograms are often used for measuring changes resulting over a period of time from special efforts to bring isolates into closer group relationships or from some natural circumstances. Sociometric studies have been made of many types of social groups including classroom groups. Being peer-rating rather than rating by superiors, sociometry adds another dimension to the understanding of social relationships.

Psychological Tests

Among the most useful and most frequently employed tools of educational research the place of psychological tests is very significant. Psychological tests are instruments designed to describe and measure a sample of certain aspects of human behaviour or inner qualities. They yield objective descriptions of some psychological aspects of an individual's personality and translate them in quantitative terms.

Psychological tests are of various kinds depending on the different phenomena or traits they are devised to describe and measure. Chief among these are *achievement tests, intelligence tests, aptitude tests, interest inventories,* and *personality measures.* The common characteristic of all these tests is that they are used to describe status or to measure changes in status produced by certain factors, or to predict future behaviour on the basis of present performance. As such, psychological tests are frequently used as tools in school surveys, school appraisal programmes, experimental investigations, complex causal relationship studies and prognostic research.

Among the many ways of classifying psychological tests are

[9] William J. Goode and Paul K. Hatt., *op. cit.*, p. 255.

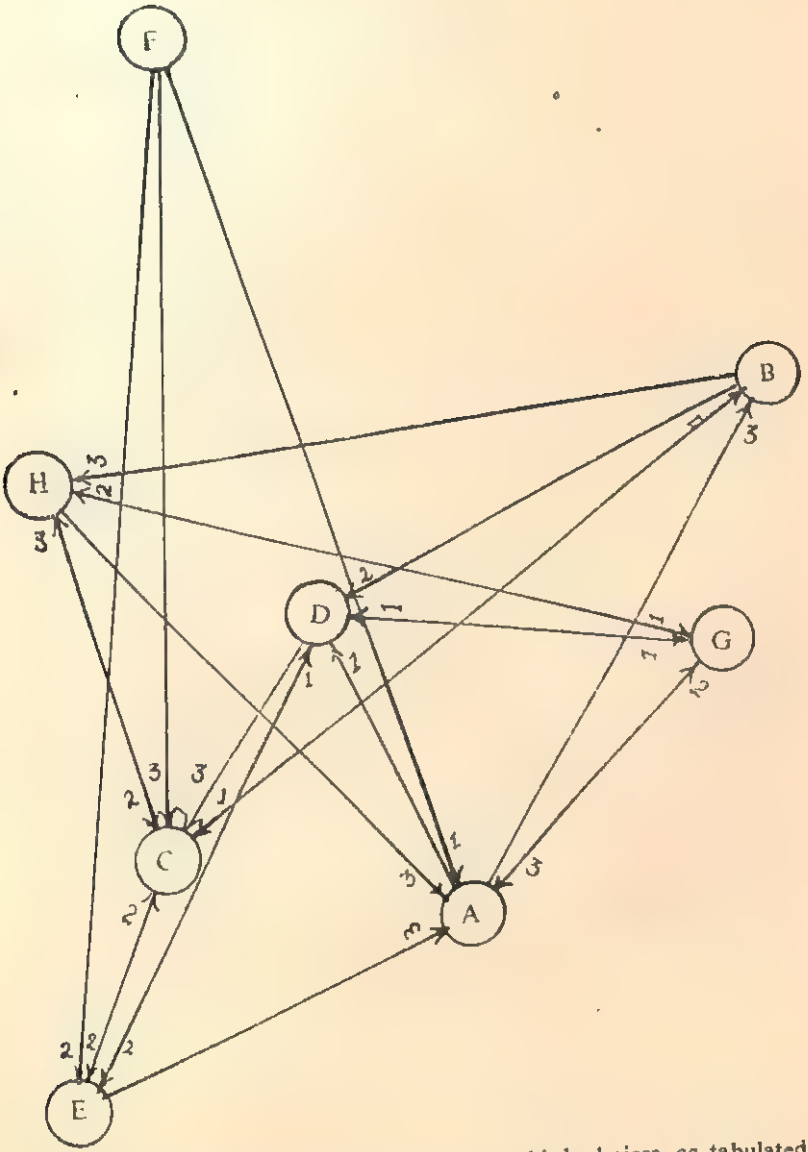


Fig. 2. Sociogram showing first, second and third choices as tabulated in the sociometric matrix above Fig. 1.

the ones which distinguish between

(*i*) performance tests and paper and pencil tests;
(*ii*) individual tests and group tests;
(*iii*) power tests and speed tests; and
(*iv*) standardized tests and non-standardized or teacher-made tests.

As the names indicate, *performance tests require* the manipulation of objects or mechanical apparatus while *paper and pencil tests* require the subjects to record their responses on a prepared sheet. Similarly, while *individual tests* are administered to the subjects individually, *group tests* are meant to be administered to individuals in a group. *Power tests* observe no time limit and the subjects attempt progressively more difficult tasks as long as they can, while *speed tests* though involving the element of power also, observe time limit. The non-standardized or teacher-made tests are not so expertly designed as the *standardized or professional* tests, however carefully they be constructed. The former are usually designed for a particular group of individuals while the latter are designed for more general use and are considered ready for use only after (*i*) a careful analysis of each item, (*ii*) a careful analysis of total scores, (*iii*) the establishment of their validity, reliability and norms, and (*iv*) the setting up of uniform and objective patterns of administration, scoring and interpretation. For purposes of educational research, tests of all the above categories are used in accordance with the problem in hand. Standardized tests (of any of the above three categories) are the most commonly used ones because they are considered more reliable, more valid and more objective than the teacher-made tests. All standardized tests may not be equally fool-proof but they are usually made as sound as possible in the light of the knowledge and experience of experts in test-construction, administration and interpretation.

1. Achievement Tests

Among the various types of tests used in schools, achievement tests are the commonest. They propose to measure what and how much pupils have learnt as a result of formal or informal instruction. They measure the present level of

performance of individuals or groups in academic learning. Achievement test scores are used in deciding which grade a student is suitable for or what his strengths and weaknesses are. Frequently, achievement tests are utilized for evaluating courses of study or efficiency of teachers and teaching methods, or other educational factors.

Achievement tests may be *traditional or essay-type* and *new-type* or *objective*. The shortcomings and faults of the traditional achievement tests have led to the development of objective tests. The salient features of the new-type tests of achievement are :

(*i*) They consist of a large number of individual test items requiring short answers or responses which take very little time on the part of the students.

(*ii*) The items are based on an extensive sampling of the course of study and are arranged sometimes in a logical, and sometimes in a random order.

(*iii*) The items are phrased briefly in unambiguous terms and permit of only one correct response.

(*iv*) The items are of various types—the main classifications being (*a*) recall type and (*b*) recognition type.

(*v*) These tests bear clear objective instructions as to their administration, answering and scoring. Scoring keys are prepared in advance. Each correct response secures one score and wrong response a zero.

(*vi*) These tests may be oral or written, performance or paper-pencil, speed or power, depending on the subject or purpose for which they are devised and administered. Achievement tests may be standardized or non-standardized. Many standardized tests of achievement in different school subjects are available for different grades or age-groups in advanced foreign countries. In India too some standardized tests in specific subjects have been prepared, and are being prepared.

2. *Intelligence Tests*

Conceived of as an inborn general ability which enters into performance of all activities and which differs in quantity from person to person, *intelligence* is a factor which determines a

good deal of educational outcomes. In experimental designs intelligence is a significant variable which stands in need of being controlled. In studies of the causal relationship kind, intelligence of the subjects is a factor which has often to be measured. In normative survey studies also, sometimes intelligence is described and measured. The tools that are used for the purpose of measuring intelligence are intelligence tests.

Intelligence tests may be classified into

(*i*) Performance tests and Verbal tests;
(*ii*) Oral tests and Paper-pencil tests;
(*iii*) Group tests and Individual tests;
(*iv*) Omnibus tests and Battery of tests; and
(*v*) Point-scales and Age-scales.

Whatever the type, an intelligence test is marked by the following characteristics:

(*i*) It measures the quality termed intelligence only indirectly through testing the person's present performance in situations where intelligence operates.
(*ii*) The items in any intelligence test are numerous and varied. They test many different abilities which are supposed to constitute intelligence.
(*iii*) The items are, as far as possible, knowledge-free.
(*iv*) The items are, as far as possible, culture-free.
(*v*) Objective and unambiguous directions for administering, answering, scoring and interpreting the test invariably accompany it.
(*vi*) The same test of intelligence supplies different norms for different age-levels and groups. Norms calculated for different ages and groups are essential factors in the use and interpretation of test scores.

Constructing and standardizing tests of intelligence of various types is a long and painstaking activity requiring, besides expert planning, preparation and organization of work, steady application over a long period of time. It requires lots of statistical calculation and testing and retesting before such tests are finally available for use. Amounting to a complex research activity, construction and standardization of intelligence tests is not the work of individual researchers but requires team work

and cooperation of many.

3. Aptitude Tests

Aptitude tests attempt to predict the capacities or the degree or achievement that may be expected from individuals in a particular activity.[10]

Intelligence tests are also a kind of aptitude test as they describe and measure the general ability which enters into the performance of every activity, and thus predict the degree of achievement that may be expected from individuals in various activities. But the term aptitude test is more commonly reserved for the tools which measure and describe *special abilities, capacities or talents* which are supposed to determine the level of achievement that can be expected from individuals in specific fields of study and activity.

Like intelligence, aptitude also cannot be measured directly. It can only be inferred on the basis of present performance. Aptitude tests are, therefore, so designed as to predict improved performance with further training in the area under question—mechanical and manipulative skills, literary or specific studies, musical and artistic pursuits. For constructing an aptitude test in Music, for example, one has to consider the factors which enter into good musical performance—ability to remember between differences in pitch, rhythm, pattern, intensity, etc.—and to include items which would measure an individual's present standing with regard to such factors. Present level of achievement in these tasks must provide a fair predictive index of his ability to profit from further training in Music.

Aptitude tests have proved useful in dividing students into fairly homogeneous groups in schools. They have been used to select individuals for particular courses of study and guide them into areas where the probability of their achieving success is the greatest. For research in educational and vocational guidance, for research in selection of candidates for particular courses of study or professional training, for research of the complex causal-relationship type, aptitude tests have proved of great value.

4. Interest Inventories

Persons differ in their interests, likes and dislikes. Interests

[10] John W. Best, *op. cit.*, p. 172.

are a significant element in the personality pattern of individuals and play an important role in their educational and professional careers. The tools used for describing and measuring interests of individuals are the *interest inventories* or *interest blanks*. They are *self-report instruments* in which the individuals note their own likes and dislikes. They are of the nature of standardized interviews in which the subject gives an introspective report of his feelings about certain situations and phenomena which is then interpreted in terms of interests.

The use of interest inventories is most frequent in the areas of educational and vocational guidance and case studies. Distinctive patterns of interest that go with success have been discovered through research in a number of educational and vocational fields. Mechanical, computational, scientific, artistic, literary, musical, social-service, clerical and many other areas of interest have been analysed in terms of activities. A person's stated likes and dislikes in terms of specific activities are sorted into various interest areas and percentile scores are calculated for each area. The area where a person's percentile scores are relatively higher is considered to be the area of his greatest interest which he would be happiest and most successful to work in.

As a part of educational surveys of many kinds, children's interests in reading, in games, in dramatics, in other extra-curricular activities and in curricular work, etc. are studied.

Construction of interest inventories is yet in its developmental stage and not many definite rules and principles can be laid down for guidance in this technique. *Strong's Vocational Interest Inventory* and *Kuder's Preference Record* should, however, serve as standard specimens in the field.

5. Personality Measures

For the measurement of certain personality traits or tendencies various instruments have been devised in recent years. Personality testing, however, is yet in its formative years and more research is being carried out towards constructing and improving such tools.

Personality measures are mainly of two kinds : *(i) direct* or *inventories* and *(ii) indirect* or *projective techniques*. Personality inventories are like interest inventories requiring the subjects

to self-report on their personality patterns. The individuals check responses to certain questions or statements designed to measure certain personality traits or tendencies. Possessing many of the characteristics of inquiry froms like questionnaire and rating-scale, they can be considered tests only to the extent that they are carefully standardized and yield quantitative measures. An inventory which has often been used as a research device to identify and describe certain personality traits among students is the *Mooney Problem Check List.*[11] It is an inventory (in two forms) to be used by students in reporting their own problems of adjustment. This inventory lists a number of possible problems, classified in different categories, from which the students have to check those which, from their own viewpoint, trouble them. These responses yield not only a verbal picture of individual's adjustment problems but also quantitative scores—categorywise as well as total—which indicate the degree of difficulty he feels he is experiencing in his adjustment. The Mooney Problem Check List seems to have set the pattern for constructing more personality inventories by researchers in psychology and education.

The validity of these direct personality measures called inventories, however, is limited. Individuals are sometimes unable to report their own reactions accurately or objectively. Lack of insight into their own selves, the emotional involvement of an individual with his own problems and the tendency to withhold embarrassing responses—all these limit the effectiveness of such personal-adjustment scales.

Somewhat free from limitations of personality inventories are the projective tests of personality which disguise their purpose so completely that the individual unconsciously projects his personality through his responses to given situations. *Rorschach's ink-blot test, T.A.T., C.A.T. Rosenzeweig's Picture-Frustration Study*, are all projective techniques where, in reaction to vague visual pictures or symbols, individuals project their own personalities. *Tautophone* and *Word-Association Tests* present various sounds and words respectively as stimuli for the purpose of recording reactions which are later interpre-

[11] Ross L. Mooney, *Problem Check-List*, Columbus, Ohio: Bureau of Educational Research, Ohio State University, 1941.

ted, according to a set scheme of interpretation, to get a picture of the individual's personality. Tests and techniques of this category, however, present problems of more or less developmental and promotional try-out. Sentence-completion, story-completion, argument-completion, etc. are other similar devices which depend a good deal on subjective judgment and skill of interpretation.

For personality assessment the use of observation is also quite commonly made under pre-arranged conditions.

Many studies have been made, using the various devices of personality assessment. The relative newness of the field suggests that there are many opportunities for the researchers in this area.

SUMMARY

1. For the purpose of collecting new relevant data for a research study, the investigator needs to select proper instruments, termed as *tools*, out of a variety of them.
2. The major tools of research can be classified into broad categories of *inquiry forms*, *observation*, *interview*, *social measures* and *psychological tests*.
3. Among the *inquiry forms* the most frequently used tool is the *mailed questionnaire*, a list of open-end or closed questions, devised and despatched to secure particular information from some persons. Careful construction and judicious administration are necessary for securing sufficient satisfactory responses. Data secured have to be analysed and interpreted most carefully. *Schedule* is the type of questionnaire which is administered personally to individuals or groups. *Check-list* is the simple laundry-list type of questionnaire which is set in the form of categories for the respondents to check for varied purposes. Completeness, clarity and proper organisation of items in check-lists help both the respondent and the researcher. *Rating scale* is the type of inquiry form which is devised and administered for the purpose of securing judgments of certain persons about certain limited aspects of individuals, groups or performances. They measure the degree or amount of the indicated judgments. *Ranking* is a device used for similar purposes. Construction

and interpretation of rating scales is not an easy job. *Score Card* is an elaborate form of rating scale, providing for the appraisal of a relatively large number of aspects, yielding a total, weighted score. *Opinionnaire* or *Attitude scale* is the device by which the inner feelings or beliefs of persons are described and measured indirectly through securing their responses to a set of favourable statements. The Thurstone and Likert techniques are commonly adopted for attitude scaling.

4. *Observation* deals with the overt behaviour of persons in controlled or uncontrolled situations. As a research tool it has to be carefully planned, purposive and well conducted and recorded. It possesses certain peculiar advantages over other types of tools. It may be participant or non-participant.
5. *Interview* is an oral type of questionnaire whereby the subject supplies the needed information in a face-to-face relationship. Specially appropriate for dealing with young children, illiterates, the dull and the abnormal, it is put to various uses—diagnostic, clinical or research. Individual or group, interviews may be conducted by single or panel interviewers. Non-directive, focused or depth interviews are different forms based on the socio-psychological roles of the interviewer and interviewee. A good interview requires proper preparation, skilful execution, adequate recording and interpretation, which call for a high degree of expertness, objectivity and insight on the part of the interviewer.
6. *Social Measures* in the form of *social distance scales, guess-who-technique* and *sociometry* have been devised for describing and measuring social relationships, values and attitudes, etc. The social distance scale consisting of a number of scaled situations attempts to measure the degree to which persons are accepted or rejected by others. The guess-who-technique, through asking the subjects to fit persons to a series of roles played by individuals in a group, secures significant peer judgments. Sociometry, through designating meaningful choice situations and asking the subjects to name person or persons, in order of preference, whom they would like to associate with or not, gets a measure of social distance.

Sociometric matrix and sociogram are ways of representing, in the form of a table and a diagram respectively, data secured from the members of a small group.

7. *Psychological Tests* are tools of various kinds (performance, paper-pencil, individual, group, power, speed, standardized and non-standardized, etc.) designed to measure specific aspects of human behaviour and inner qualities. Chief among these, used for educational research are *achievement tests* which measure the level of performance of individuals or groups in academic learning. Objective or new-type items rather than the traditional, essay-type questions form the content of such tests, whether standardized or not. *Intelligence tests* of various types (performance verbal, oral, paper-pencil, individual, group, omnibus, battery, point-scale and age-scale, etc.) measure but indirectly the *general ability* of persons through numerous and varied items supposed to be knowledge and culture-free. These tests are accompanied by objective and unambiguous directions for administration, scoring and interpretation. Aptitude tests measure the *special abilities* of persons which determine their possible level of achievement in particular activities. They are used for purposes of grouping or selection of candidates for education and training, etc. *Interest inventories* require the subjects to record their own likes and dislikes about certain situations or phenomena. This information is of use in educational and vocational guidance. *Personality measures* whether in the direct form of *inventories*, or the indirect form of *projective technique* are used for measuring certain personality traits, and finding out the subjects' personality patterns. While the direct measures easily suffer from lack of validity due to the respondent's bias, the indirect measures suffer from reasons found in the researcher's interpretation of responses. Personality tests are still in their formative period.

QUESTIONS AND PROBLEMS

1. "Like the tools in a carpenter's box, each research tool is appropriate in a given situation to accomplish a particular purpose."—(J. W. Best). Elaborate upon this statement and describe the tool or tools you would

select for

(*i*) studying the behaviour of children in a nursery school;

(*ii*) measuring the achievement of a particular grade of children in a specific subject;

(*iii*) studying the phenomenon of personal preferences among teacher-trainees;

(*iv*) finding out the present status and causes of delinquency among adolescents.

2. "Each data-gathering device has both merits and hazards or limitations." —(J. W. Best). Discuss this statement with special reference to

(*i*) Attitude Scales,

(*ii*) Interview, and

(*iii*) Interest Inventories.

3. Why is Questionnaire considered to be "the most used and most abused of data-gathering devices?" In what circumstances is it justifiable to use questionnaire as a tool of research and how can it be made to yield the desired results?

4. Personality Measures and Social Measures are both in their formative period as yet and provide opportunities for research in their construction and validation. Do you agree? If yes, consider and describe two problems for research you might take up in these areas.

5. What type of instruments are Rating-scales and Score-cards? Describe their uses and limitations and state a problem of research in education for which you can use either or both of these tools.

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CHAPTER SEVEN

Procedure in Educational Research—D

Organization, Analysis and Interpretation of Data, and Formulation of Conclusions and Generalizations

Organization af data—editing, classifying and tabulating. Analysis of data—at various stages; exploratory steps; statistical metdods of analysis (common and special). Interpretation of data—nature; causes of misinterpretation; use of simple comparisons; use of some statistical formulae. Formulation of conclusions and generalizations—characteristics of good generalizations—common errors; some practical hints.

The next steps in the process of research are the organization, analysis and interpretation of data and formulation of conclusions and generalizations to get a meaningful picture out of the raw information collected.

Organization

The mass of data collected through the use of various tools, however reliable, valid and adequate it may be, is yet but raw. It needs to be systematized and organized, *i.e.* edited, classified and tabulated before it can serve any worthwhile purpose.

Editing implies the checking of gathered data for accuracy, utility and completeness.

Classifying refers to the dividing of the information into different categories, classes or heads, for use.

Tabulating denotes the recording of the classified material in accurate mathematical terms, *e.g.* marking and counting frequency tallies for different items on which information is gathered. Tabulation is a tedious and painstaking process and must be accurate. Before tabulating, all raw data should be tested on the basis of the purpose for which is gathered and only the useful and usable data should be tabulated. Tabulating machines and other mechanical aids to tabulating are becoming current. They are quick as well as precise but very expensive

and beyond the means of individual researchers.

Analysis

Analysis of data means studing the tabulated material in order to determine inherent facts or meanings. It involves breaking down existing complex factors into simpler parts and putting the parts together in new arrangements for purposes of interpretation.

Analysis as a process enters into research in one form or the other from the very beginning—in the selection of the problem, in the determination of methods and in interpreting and drawing conclusions from data gathered. A plan of analysis can and should be prepared in advance before the actual collection of material. A preliminary analysis on the skeleton plan should, as the investigation proceeds, develop into a complete, final analysis—enlarged and reworked as and when necessary. This process requires an alert, flexible and open mind. Caution is necessary at every step. No similarities, differences, trends and outstanding factors should go unnoticed. Larger divisions of material should be broken down into smaller units and rearranged in new combinations to discover new factors and relationships. Data should be studied from as many angles as possible to find out new and newer facts.

In cases where a plan of analysis has not been made beforehand, Good, Barr and Scates suggest four helpful modes, to get started on analysing the gathered data:[1]

(*i*) To think in terms of significant tables that the data permit.

(*ii*) To examine carefully the statement of the problem and the earlier analysis and to study the original records of the data.

(*iii*) To get away from the data and to think about the problem in laymen's terms, or to actually discuss t h problem with others.

(*iv*) To attack the data by making various simple statistical calculations.

These exploratory modes, though mechanical, may prove very worthwhile in discovering a problem of equal or greater

[1] Carter V. Good, A. S. Barr & Douglas E. Scates, *ibid.*, pp. 599-601.

significance than being worked out.

In the general process of analysis of research data, statistical methods have contributed a great deal. Simple statistical calculations find a place in almost any research study dealing with large or even small groups of individuals, while complex statistical computations form the basis of many types of research. It may not be out of place, therefore, to enumerate some statistical methods of analysis used in educational research.

Common Statistical Methods of Analysis

Most commonly used methods of analysing data statistically are :

1. Calculating frequency distribution, (usually in percentages) of items under study.
2. Testing data for normality of distribution—skewness and curtosis.
3. Calculating percentiles and percentile ranks.
4. Calculating measures of central tendency—Mean, Median and Mode—and establishing norms.
5. Calculating measures of dispersion—Standard Deviation, Mean Deviation, Quartile Deviation and Range.
6. Calculating measures of relationship—Coefficients of correlation, Reliability and Validity by the Rank Difference and Product Moment methods.
7. Graphical representation of data—Frequency Polygon Curve, Histogram, Cumulative Frequency Polygon and Ogive, etc.

Investigators usually make use of as many of the above simple statistical devices as necessary for the purpose of their study while analysing their data. There are some other complicated devices of statistical analysis listed below which researchers use in particular experimental or complex causal-comparative studies and investigations.

Special Statistical Methods of Analysis

1. Tests of students' 't' and Analysis of Variance for testing significance of differences between statistics—especially between Means.
2. Chi-Square Test for testing Null Hypotheses.
3. Calculation of Biserial 'r' and Tetrachoric 'r' for finding

out relationship between different phenomena in complex situations.

4. Calculation of Partial and Multiple correlation and of Bivariate and Multivariate Regression Equations for finding out causal relationship between various phenomena involved in a situation.
5. Factorial Analysis for the purpose of analysing the composition of certain complex phenomena.

INTERPRETATION

The process of interpretation is essentially one of stating what the results (findings) show. What do they mean ? What is their significance ? What is the answer to the original problem ?[2]

Interpretation is thus, by no means a mechanical process. It calls for a critical examination of the results of one's analysis in the light of all the limitations of his data-gathering. Interpretation, a most important step in the total procedure of research, is purely subjective and many errors are made at this stage. An adequate knowledge, not only of techniques of research, but also of one's field of study, and a capacity to do careful and critical thinking are very essential to safeguard against misinterpretation of facts collected. Common causes of misinterpretation of facts are:[3]

(*i*) Ignoring unstudied factors.
(*ii*) Ignoring selective factors.
(*iii*) Difficulties.

Unstudied factors

Any result in educational research is conditioned not by one or two but innumerable factors. In experimental or causal-comparative types of research one studies only a very limited number of factors. The unstudied factors or variables may or may not be important determinants of the result secured. To totally ignore the unstudied factors and ascribe the secured or studied result to the occurrence of studied factors alone may be misinterpreting the actual truth, *e.g.* if a person, who finds that a particular method of teaching a subject has worked better with one group than another method with another group,

[2] Carter V. Good, A. S. Barr & Douglas E. Scates, *ibid.*, p. 617.
[3] *Ibid*, pp. 618-623.

ascribes the better achievement to the method alone and ignores the other possible determining factors like superior intelligence, older age, better teacher, better home conditions, more incentive, time or interest found among the superior group, will be grossly misrepresenting truth.

Ignoring Selective Factors

In investigations where a selective group is made the subject of study (*e.g.* institutionalized delinquents) or where a selective factor is operating on the situation studied (yearwise failures in a four-year course) one is likely to reach unwarranted conclusions if one ignores the selective factors. To find that all the institutionalized delinquent children have a low level of intelligence and to conclude, therefore, that all delinquents have a low intelligence level is ignoring the fact that there exist outside the institution, many delinquent children with normal or above-normal intelligence. Similarly, to find that in a four-year course, the number of students failing goes on decreasing from the first to the fourth year and to conclude from this that the fourth year studies are easier than the first year studies is ignoring the fact that the poorer students who fail in the previous years usually get dropped out and do not reach the subsequent years of the course in large numbers.

Difficulties of Interpretative Evaluation

In studies of the simple, descriptive nature – historical or normative survey—proper interpretation of data rests on proper evaluation of facts. It is found that the information collected through such means as the questionnaire or the interview contains facts of two types: (*a*) objective facts and (*b*) facts of opinion.

If fifty per cent of the teachers studied express that the curriculum prescribed by a Board of Education for the High School Examination is satisfactory while fifty percent say that it is unsatisfactory, what is the investigator to understand by his data? The data surely represents facts of opinion and it would be wrong to translate it into objective facts and say that fifty per cent of the curriculum is satisfactory and fifty per cent is not. The investigator is not even in a position to judge

which of the two groups is right unless he has studied and evaluated the curriculum himself and assumes that his judgment on the point is correct. Even a cent per cent agreement of a group on any point does not indicate that it is an objective fact unless the objective fact itself is elicited.

Interpretation of frequencies also poses difficulties for the investigator. Does a higher frequency of occurrence of any phenomena always imply a greater importance of that phenomena? If a particular topic of study (*e.g.* moral education) finds place in the curriculum of very few schools while another subject (*e.g.* physical training) finds place in almost all schools, are we to conclude that the latter is more important and is so considered by the majority of schools ?

On the findings of a study the investigators often try to pass certain judgments which are naturally coloured by their subjective opinions on the subject. If one finds out that the salaries of Nursery School teachers are almost equal to those of High School teachers in the area he is studying, he may go on to say that it is a fortunate or an unfortunate fact, according to his beliefs or convictions in the matter. This kind of interpretation, however, is based on his personal attitude, not on relatively incontrovertible logic of the facts found. He is free to make such personal, interpretative comments but he should keep them separate from the actual findings of the investigation.

Similarly, explanation of one's research findings in terms of their practical implications, which often forms a usual part of the researches undertaken, is fraught with the danger of misrepresentation. Factual interpretation and personal interpretation of their implications should never be confused. They should be kept apart in a research report.

Use of Simple Comparison in Interpretation

The element of comparison is fundamental to all research interpretations. Comparison of one's investigational findings with a criterion, with results of other comparable investigations, with normal or ideal conditions, with the judgment of a panel of judges or opinions of educational experts forms an important aspect of interpretative efforts of a researcher.

Use of some Statistical Formulae for Interpretation of Results

It is essential, while interpreting the results secured after a statistical analysis of complex data, to test whether the observed values or differences in statistics (Mean, Standard Deviation, or 'r') are at all significant; whether they are not caused by chance errors of sampling; if significant, how significant they are. For answering such questions the statistical device used is that of calculating the Probable Error of the statistics in question. It takes the following forms:

1. Probable Error of the Mean.
2. Probable Error of the Median.
3. Probable Error of the Correlation Coefficient.
4. Probable Error of the Difference between two Means or other measures.
5. Chi-Square Test.
6. Tests of students' 't' and Analysis of Variance.

It is only after applying the suitable statistical formulae that the investigator can say at what levels of significance the results can be relied on, or in other words, what the extent of the play of chance factors is in the observed results.

Formulation of Conclusions and Generalizations

In so far as the purpose of scientific research is to derive verified and verifiable generalizations, an educational research worker has to exercise all care and caution in formulating his conclusions and arriving at any generalizations on the basis of his data. Like interpretation of results, the formulation of conclusions and generalizations also demands keen observation, wide outlook and power of logical thinking.

According to Good, Barr and Scates the *characteristics of good generalizations,* like those of good hypothesis, are the following:[4]

(*i*) Generalizations should be conceivable and in agreement with fact.

(*ii*) They should not conflict with the known laws of nature or previously established generalizations.

(*iii*) They should be stated in the simplest possible terms.

(*iv*) They should be amenable to deductive reasoning.

[4] *Ibid.*,.p. 632.

Common errors in reaching conclusions and formulating generalizations are:

(*i*) Generalizing upon unrepresentative or selective data.
(*ii*) Generalizing upon insufficient or incomplete data.
(*iii*) Assuming relationship among two things only because they happen together.
(*iv*) Making illogical comparisons.
(*v*) Disregarding data contradictory to the desired results; in other words, working with a bias.
(*vi*) Drawing conclusions which are inconsistent among themselves or with external realities.

Some hints in formulating generalizations

(*i*) Before drawing up conclusions and generalizations it is advisable to summarize the findings of the study and compare them with the hypotheses formulated in the beginning.
(*ii*) All conclusions drawn should be based on the evidence of sound, adequate data. All questionable or incomplete data and untested assumptions should be avoided.
(*iii*) Before any conclusions and generalizations drawn are accepted as valid, they should be tested for agreement with facts and laws of nature already established, and for verifiability.
(*iv*) They must be stated in simple and precise terms.
(*v*) They must answer the questions asked in the statement of the problem.
(*vi*) They must prove or disprove the hypothesis or hypotheses made in the beginning.
(*vii*) They must recognize the limitations due to faulty or incomplete data.
(*viii*) They may be accompanied by suggestions for application to practice, and suggestion of problems for further investigation.

SUMMARY

1. The data collected by means of various tools need to be systematized through the processes of careful editing, thoughtful classification and painstaking and accurate tabulation.

2. Analysis of data to discover inherent facts or meaning is the next step, although the process of analysis invariably enters all research studies at various previous stages too. Thinking in terms of significant tables, examining the original statement of the problem, taking a distant, laymen's view of the data and attacking the data through simple statistical measures are some of the practical ways of finding out proper modes of analysing the data collected. Many simple and complex statistical methods are used in the analysis of data.
3. Interpretation of the analysed data, a relatively subjective step, requires a thorough understanding of the field of study and critical and careful thinking about the techniques employed. Misinterpretation of facts collected usually occurs due to ignoring unstudied factors, ignoring selective factors, and due to the many difficulties of interpretative evaluation.

   Simple comparison with a criterion, with the results of other studies, with normal or ideal conditions is an important part of interpretation. Use of special statistical formulae is often made to interpret the significance of the results found through analysis of data.
4. Formulation of conclusions and generalizations, a subjective step like interpretation, needs to be undertaken with utmost care and caution so that they are conceivable and in agreement with facts ; they should not be in conflict with the previously established generalizations ; they should be stated in simplest terms, and must be amenable to deductive reasoning. Common errors in generalizing must be avoided by following the hints given in the text.

QUESTIONS AND PROBLEMS

1. "It may be fair to say that research consists in general of two steps—the gathering of data and the analysis of these data"—(Good, Barr and Scates). Do you agree? Give your views about the above statement keeping in mind the part played by analysis at various stages of research.
2. As important as any other step in a research study is the interpretation of data and it requires even more care and caution. Why? Discuss the purpose, nature and difficulties of proper interpretation of data collected.

3. Pick up the report of a recent research investigation and comment on the process of organization, analysis and interpretation of data adopted in it.
4. Critically examine the conclusions and generalizations formulated by an investigator in a recent educational research study and state how they could be improved upon if necessary.

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CHAPTER EIGHT

Methods of Educational Research—A Historical Method

Procedure and methods distinguished. Various classifications of methods. Generally accepted broad classification—Historical, Normative Survey, Experimental and Complex Causal-Comparative methods.

The Historical Method. Value of historical research in education. Steps in historical research—collection of data (primary and secondary sources); criticism of data (involving problems of organization, composition, exposition and interpretation). Types of educational history. Legal research in education. Bibliographical or summarizing studies.

In the previous four chapters (IV, V, VI and VII), under the heading "Procedure in Educational Research", we have discussed the various steps involved in a systematic piece of research. In the present chapter and the subsequent three chapters we propose to discuss an allied but different topic, *viz.* "Methods of Research". It is not infrequent to find the terms *methods* and *procedure* used interchangeably in research literature. It is because both the terms are generally understood to connote tools and techniques adopted in a research study. But in the present book we have tried to distinguish between the two terms because we find that research investigations in any field of knowledge can be of different types (*e.g.* historical, normative survey, experimental, case-clinical, developmental or statistical, etc.) but they all involve, more or less, the same steps of procedure. Research studies are distinguished on the basis of their different purposes and approaches and that is what may technically be called difference in "methods". Research studies adopting different methods, however, do not, as a rule, differ significantly in their procedures. Selection, formulation and definition of the problem, survey of related information, collection, analysis and interpretation of new data and reporting of the work done are steps of procedure common to all types or methods of research. Hence it can be held that steps of procedure in educational research are an element

common to all educational investigations while methods of research in education are broad distinguishing features of different researches.

Classifications of methods of research are as varied as the meanings in which the term 'methods' is used.[1] Henry Lester Smith gives an alphabetic list of as many as 131 terms used in literature, dealing with educational research to denote the procedure and methods used in studying research problems[2]. There is, obviously, a lot of overlapping and duplication in the content of the list and it includes terms which are either too broad and vague or too narrow and limited to describe different approaches to the study of any problem. The author states that no study is carried out through the use of only one of those methods. In every piece of research different methods are used in different stages of its development.

To avoid the use of the term *methods* for *partial approaches* or *techniques*, it seems desirable to classify the innumerable purposes and ways of uncovering evidence, and of analysing and interpreting it into some such generally accepted methods as

1. the historical or documentary,
2. the normative survey or descriptive,
3. the experimental, and
4. those adopted to complex-causal relationship studies.[3]

When classified in the above manner, there is not much overlapping or confusion among the different methods. They are neither mysterious nor unduly complex. "Basically they are simple and are founded on commonsense".[4]

In any specific study, although it is more common to apply any one of the above methods, yet there is no reason why more than one method may not be applied, if necessary. For

[1] "There are many ways and means of gathering, analysing and reporting research data. Educators are not in thorough agreement as to the so-called methods of collecting and handling the data, however . . . In research literature many variations of different term are used to designate shades of meaning. Research workers use terms which suit their own needs and express their own purposes"—Henry Lester Smith, *op. cit.*, p. 89.

[2] *Ibid*, pp. 89-91.

[3] Carter V. Good, A. S. Barr and Douglas E. Scates, *op. cit.*, pp. 223-224.

[4] T. H. Hillway, *op. cit.*, p. 125.

example, why should one not seek the solution of a problem by first studying its history and then determining its present status by some sort of survey? In any given investigation it may be not only desirable but even necessary to use two or more general types of research methods in combination. The decision about the method or methods to be employed, however, always depends upon the nature of the problem selected and the kind of data necessary for its solution. Methods selected should always be appropriate to the problem under investigation, feasible, preplanned and well-understood. Some changes and additions in the details of the methods may be necessary as the study proceeds, but the main plan of approach should be ready at the start and the researcher should be able to describe it clearly. "If the scholar cannot clearly describe his method, the chances are that it is too vague and general to yield him satisfactory results."[5]

The Historical Method

History, in any field of enquiry is an integrated narrative of past events representing a critical search for the whole truth. Historical approach to the study of any subject denotes an effort to recount some aspect of past life. The possible field for historical research is as broad as life itself. The use of historical sources and techniques in the field of education has been adopted from the universal application of the historical approach in the study of problems from scientific or social fields.

Value of Historical Research in Education

It is needless to emphasize the contribution made by significant historical materials in such areas of education as philosophy or principles of education, elementary education, secondary education, higher education, educational administration, training of teachers, rural education, adult education. Significant historical research has a clear functional purpose rather than a merely academic one. To profit by the experiences of the past in the solution of the present day problems justifies the worthwhileness of historical research. The educa-

[5] T. H. Hillway, *ibid.*, p. 126.

tional historian is not so much interested in the purely unique aspects of past experiences as in the elements which may serve as a basis for tentative generalizations in analysing current issues and problems. E. W. Knight's analysis of the value of historical research in education, quoted by Good, Barr and Scates, is quite exhaustive.[6] He states that

1. A knowledge of the history of schools and other educational agencies is an important part of the professional training of the teachers or the school administrators.
2. Much of the work of the school is traditional. The nature of the work of the teacher and the school administrator is restrictive and tends to foster prejudices in favour of familiar methods. The history of education is the 'sovereign solvent' of educational prejudices.
3. The history of education enables the educational worker to detect fads and frills in whatever form they may appear, and it serves as a necessary preliminary to educational reform.
4. Only in the light of their origin and growth can the numerous educational problems of the present be viewed sympathetically and without bias by the teacher, the school administrator, or the public.
5. The history of education shows how the functions of social institutions shift and how the support and control of education have changed from very simple local arrangements to those that are now somewhat centralized and complex.
6. The history of education is an ally in the scientific study of education rather than a competitor. It serves to present the educational ideals and standards of other times, and it enables social workers to avoid the mistakes of the past.
7. It 'inspires' respect for sound scholarship and reverence for great teachers.

Major Steps in Historical Research

Historical research differs from research of the experimental type because it is based on reports of observations which cannot be repeated although similar events may recur. But a historical research worker has to pass through similar preliminary stages of selecting, stating, defining and delimiting his problem as a researcher using any other method of investigagation. But his main attack of the problem must differ from that of other investigators, because it is not based upon experimentation or direct observation, but upon reports of observations which cannot be repeated. The three major steps characteristic of the historical type of research are :

[6] Carter V. Good, A. S. Barr and Douglas E. Scates, *op. cit.*, p. 243.

1. Collection of data through primary and secondary sources.
2. Internal and external criticism of the data collected.
3. Presentation of facts in a readable form involving problems of organization, composition, exposition and interpretation.

Collection of data

Historical sources are usually classified into two main categories—primary and secondary.

1. Primary Sources

The original documents or remains which are the first witnesses of a fact are termed as primary sources. They are sources of data fundamental to historical research and form its only solid basis. They may be of two different kinds:

(*a*) *Consciously transmitted information* in the form of oral or written testimony or the records kept and written by actual participants or witnesses of an event, *e.g.* constitutions, charters, court decisions, official minutes or records, autobiographies, letters, diaries, geneologies, contracts, deeds, wills, permits, licences, declarations, proclamations, certificates, bills, receipts, magazine and newspaper accounts, advertisements, maps, diagrams, books, pamphlets, catalogues, films, pictures, paintings, inscriptions, recordings, transcriptions and research reports.

(b) Unconscious testimony in the form of remains or relics, *e.g.* human remains (fossils, tools, weapons, household articles, and clothes, etc.) and language, literature, arts and institutions of various types.

In both the conscious and the unconscious testimony of this type only one mind, that of the observer of the event, comes between the original event and the user of the information about it.

2. Secondary Sources

The sources of information transmitted by one who was neither a participant in, nor an eye-witness of, the original event are called secondary sources. These are generally of limited worth in scientific research work because they are second hand information from one who merely reports what an actual

participant or witness said or wrote. They are often several times removed from the original event. Most history text books and encyclopaedias are examples of secondary sources.

For a good research project it is necessary for the researcher to search his data from as many primary sources as he can lay his hands on. Secondary sources may sometimes prove very useful in providing information about primary sources, but they should never be taken as final.

Historical Criticism

We have seen that by virtue of the nature of the historical research the historical research worker has to depend on the conscious or unconscious testimony of others to collect material for his study. He cannot say how valid, reliable or significant the data he has been able to collect are unless he carefully analyses them and sifts the true and the significant from the irrelevant, false or misleading. The process of appraisal which is used to derive usable and trustworthy data, called *historical evidence*, is known as historical criticism. It consists of two parts—external criticism and internal criticism.

1. External Criticism

It is aimed at establishing the authenticity or genuineness of the data lest the worker may waste his labour on forged or counterfeit documents. It is concerned with the question whether a document really is what it purports or seems to be. To establish the genuineness of age or authorship of documents, one may have to use many an intricate test of signature, handwriting, script, type, spelling, language, usage, documentation, etc. It may involve physical and chemical tests of the material data—of ink, paint, paper, or parchment, cloth, stone, metal or wood. One must make sure that all the elements connected with the form of the data are not inconsistent with already known facts about its author and about the social and technological conditions of the period in which the remains or the document is supposed to have originated. In other words, the validity of the sources used must be established before their content is evaluated and used for research purposes.

2. Internal Criticism

This is aimed at evaluating the accuracy or worth of the

documents collected. A document may be authentic and yet not reliable. It may be genuine in its authorship but it may not reveal a true picture of the person, time or event under investigation. Its author may not have been competent, honest or unbiased enough. He might have had some motives for distorting the account. He might have worked under fear, pressure or vanity. An unduly long period of time may have elapsed between the incident and its recording, so that memory might have failed in presenting a complete or accurate picture. Unless the possibility of the occurrence of such distorting factors as these is weeded out by a careful examination of the content of the document, the data cannot be used as historical evidence worthy of consideration.

The research worker must be absolutely clear as to the meaning of the document he is handling. The real meaning of the writing may not be the same as its literal meaning. It is comparatively easier to find out the literal as well as the real meaning of modern writings than that of the historical sources. If allegory, symbolism, irony, jests, allusions, implications, rhetorical figures and literary artifices may often be found to stand in the way of interpreting the real meaning of modern texts, there are additional difficulties which one may face, in understanding the older documents, due to unfamiliar and obsolete terms and due to reference to strange institutions and customs. A historical research worker has to cut through all these obstacles and reach the real meaning of the author. Attempts to seek the true, literal and real meaning of the text is called *positive internal criticism*. *Negative internal criticism* is exercised when the investigator tries to seek every possible reason for disbelieving the statements made. Some possible reasons for questioning the truth of the statements may be the author's (*i*) prejudices, (*ii*) religious views, (*iii*) political bias, (*iv*) vested interests, (*v*) personal vanity or ambition, (*vi*) literary artifice, (*vii*) known ignorance about the subject, or (*viii*) known weakness for telling lies or half-truths. Other reasons may be : (*ix*) occurrence of inconsistent statements within the documents, or (*x*) inconsistency of the facts contained in this document with other reliable information.

Historical Report Writing

> Historical composition is a synthetic and constructive process that involves the mechanical problem of documentation, the logical problem of selection and arrangement of topics and sub-topics, and the philosophical problem of interpretation.[7]

The problem of documentation in writing the report of a historical research project is in no way different from the problem of documentation in reporting on any other research study. It involves the same steps in giving complete footnotes and detailed bibliographical references as in any other scientific investigation. As this topic will be dealt with in Chapter XII, we need not discuss it here.

Selection and Organization

Once the data have been evaluated for their genuineness and trustworthiness they may be used as valid historical evidence to get a meaningful picture for testing the hypothesis.

A good writer of educational history must know the historical value and significance of each topic. That is to say he must have a *historical perspective.* This perspective must guide him, for the purpose of narrative, in selecting only the relevant, material and meaningful data, from a mass of painstakingly gathered and evaluated data. Condensation, precision and concentration are qualities of good historical narrative. Too many irrelevant or insignificant details should not be allowed to crowd out the main actors or events of the history. The relative importance of events and topics has to be carefully calculated and kept in mind while selecting or rejecting historical data, or while arranging it in the form of a report or a narrative.

The earlier practice in historical writing presented a strictly *chronological* type of organization. Such organization involved a series of events broken up into short time-units. The writing used to be in the nature of an almanac or calendar of dates, facts, events and names. The chapters were marked off by a period of several years, or even a few months, depending on the changes of some important figures or occurrence of some significant events.

7. Carter V. Good and Douglas E. Scates, *op. cit.*, p. 242.

The organization of historical material in another way is what is known as the *topical, thematic* or *functional* arrangement. This meets the criticism, which older histories of education were subjected to, that they were a mass of comparatively unrelated facts with no adequate references to the social forces and the then prevalent activities and problems of schools and educational workers.

> Good history of education observes the conditions of good story-telling, shows purpose and meaning, and provides background for better understanding of current educational problems. A history of education that adopts a functional basis of organization, in the form of major problems or areas of contemporary education, includes such chapters as: the aim, method and curriculum of education, elementary, secondary, and higher education, and the political, psychological and philosophical bases of education.[8]

It is best to combine appropriately both the above types of organization keeping well in consideration such influences as political, economic, social, geographical, artistic, literary or philosophical, that may have been powerful at the time. The preparation of a preliminary outline at quite an early stage is always helpful in the selection and arrangement of data. Once the data has been digested, the outline can, of course, be always revised as radically as necessary.

Interpretation & Synthesis

It is the function of a historical researcher to give a new interpretation to old data or collect new historical data and interpret it as best as he can. The usual basis for such interpretation is one or the other of the various schools or theories of history, such as:

1. the *biographical, or the 'great man'* theory which holds that the main causative factors in history are the great personalities of the past;
2. the *idealistic philosophy* which discovers prominent spiritual forces determining the course of events;
3. the *scientific and technological theory* explaining all human progress as directly correlated with the scientific and technological advancement;
4. the *economic school* which contends that economic conditions and growth are the main determinants of social

[8] Carter V. Good, *op. cit.*, pp. 46-47.

and cultural developments;

5. the *geographical theory* which lays emphasis on geographical setting for adequately explaining all human actions and events; and
6. the *sociological interpretation* which extends the generalizations gathered from a study of group life to historical data.

It should be recognized that such specific schools of interpretation as the above are not mutually exclusive and that many of the best historical works are eclectic or synthetic in interpretation. The most recent and popular theory of interpretation, considered the most inclusive and important, is the one which holds that no single category of causes but a collective psychology of the period can explain all phases of historical development. This has, thus, acquired for itself such names as the *synthetic, eclectic, pluralistic or collective psychological theory.*

For an educational research worker who applies the eclectic theory of interpreting the historical data it is but essential to be well-versed in many fields of knowledge. A vigorous interpretation of data requires the investigator to have a background of archeology, anthropology, geography, philosophy, psychology, sociology, economics, political science, jurisprudence and ethics, language, literature and art, etc. Very few persons are so well equipped to write history. A historical investigator needs a proper preparation and training. The wide scope and limitless number of problems for historical research in the field of education, or in any other field, call for the writing of co-operative history. A comprehensive history of education of the whole world or of one whole country even, would be too staggering a challenge for a single person to take up. Hence the practical value of the trend toward a series of comprehensive histories treating separate periods or places or areas is being recognized.

For a good historical narrative, not only are necessary sufficient historical evidence, and a sound theory of interpretation but also the derivation of a unifying theme or principle of interpretation, a thesis so to say. This is arrived at by a satisfactory testing of the hypothesis against historical

evidence. It becomes the central theme and helps in synthesis of the material.

The importance of historical perspective in using evidence and in interpreting it is very great. In includes such valuable qualities as imagination, resourcefulness and logical thinking. It helps in properly evaluating events and personages of the past in the light of the standards and conditions of life then prevailing. It also helps in understanding the significance of the contributions of various philosophers in their own backgrounds and in using their theories to explain the data in hand.

We have discussed above the various schools of historical interpretation, the need of a sound unifying theme and the value of historical perspective in the proper synthesis and interpretation of the material gathered. It is often found that a poor logical analysis in historical writings results from one or more of the following factors:

(1) Oversimplification, *i.e.* failure to recognise that causes of events are more often multiple and complex, rather than single or simple.
(2) Overgeneralization on the basis of inadequate evidence and false reasoning by analogy, basing conclusions on superficial similarities.
(3) Failure to interpret words and expressions in the light of their usage in earlier times.
(4) Failure to distinguish between significant and trivial facts in a situation.

A good historian in education, as in any other field, should avoid such pitfalls as the above.

Style of Writing

Effective historical writings show evidence not only of scholarship, of mastery of material and of proper choice of the method of organization but also of literary excellence and effective style. Simplicity, dignity, power, lucidity and objectivity are the qualities that are often found desirable for a good historical writing. It does not mean, however, that a historian is condemned to a bald, plain, unattractive style. He may sometimes indulge in a little colour, though not letting his

embellishments to hide or distort the truth. Reports of historical research in the field of education, or in any other field, should neither be dull and colourless, nor too flowery and flippant; neither too persuasive of the soap-box type nor lacking in proper usage.

It must, however, be admitted that certain topics do not lend themselves easily to an interesting and graceful style. For example, it is not easy to write about the constitutional and legal basis of a school system, or about the laws and court decisions governing the finances of schools in anything but a matter-of-fact style.

Types of Educational History

Investigations of the documentary type in any field of study may include such areas of study as:

(*a*) Biography,
(*b*) History of institutions and organizations,
(*c*) The history of ideas,
(*d*) Sources and influences,
(*e*) Legal,
(*f*) Bibliography and summarizing studies.

In the area of education, lives of educators, history of schools, school systems and educational institutions, various social, economic, geographical, and cultural influences on the educational practices of a place or time, the philosophical theories and ideologies affecting educational theory and practice provide numerous problems for significant historical research. It is, however, only the legal and bibliographical studies in the field of education which we shall briefly discuss.

Legal Research in Education

It is a special type of historical research which utilizes (*i*) statutory law and (*ii*) case or common law, as the sources of its data.[9] It covers such topics as the legal basis of public education, relation between Central and State Governments with regard to education, educational organization in states and

[9] The statutory law includes constitutional provisions and legislative enactments. The case or common law denotes the principles applied by the courts in deciding issues not covered by the former.

districts, administration of local schools, school finance and property, legal status of teachers and pupils, text-books and curriculum and the legal aspects of higher education, etc. A number of educational studies and theses of a legal character are listed each year in the U. K. and the U. S. A.

Bibliographical and Summarizing Studies

Bibliographical survey and summarizing of a type which is exhaustive, critical and analytical and covers a span of some length in the educational field approaches in nature the technique of historical investigation. Its sources are the first-hand reports of various educational investigations. The collection of material, its criticism, interpretation and synthesis all follow the pattern of historical investigation. In many instances sounder generalizations or more emphatic conclusions can be reached through a comparison and synthesis of results from a number of related studies thus surveyed. This type of study may not be always encouraged as a problem for thesis, but its contribution to the educational literature is of considerable practical value.

SUMMARY

1. Steps of procedure in educational research are common to all research studies, while studies differ in their methods or approaches to different problems.
2. Approaches or methods are variously classified, the simplest classification being the one which distinguishes between the historical, the normative survey, the experimental methods and those adopted to complex causal relationships.
3. Researchers can use one or more of these methods in combination depending on the nature of the problem selected. They must clearly understand and pre-plan their method and approach, but not follow it too rigidly.
4. The historical method is a useful approach in studying and solving educational problems. It has both academic and practical advantages.
5. Historical studies in education are based on two types of data—primary and secondary. The secondary sources

are useful but should not be taken as final. Primary sources are the main sources in providing historical evidence.

6. Data gathered should be subjected to external and internal criticism, *i.e.* their authenticity and meaning should both be established. True, significant and relevant data should be used as historical evidence to test the hypothesis.
7. Data could be organized in a chronological or a functional order. A combination of both types of organization gives the clearest picture.
8. Interpretation of data usually takes place according to one of the many theories (bibliographical, idealistic, scientific, economic, geographical or sociological) the researcher holds true. But the best interpretation seems to be the one which recognizes the complexity of human nature and the influence of multiplicity of factors in bringing about a particular phenomenon.
9. The style of historical composition must be dignified and objective, free from fads and frills, but not dull or uninteresting.

QUESTIONS AND PROBLEMS

1. Do you agree with the distinction made between the terms 'methods of research' and 'procedure in research' in this Chapter ? Give reasons for your agreement or disagreement.
2. Find out different ways of classifying 'methods of research' adopted by at least five authorities on educational research and state which of the classifications you prefer the most. Why ?
3. What are the advantages of historical research in education? Make a list of ten important problems in Indian Education that should be tackled through the historical method. Justify your selection of the problems.
4. Select any one of the problems from the list prepared in answer to Question No. 3 and define it fully with reference to the steps involved in historical research.

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CHAPTER NINE

Methods of Educational Research—B
The Normative Survey Method

Difference between the Historical method and the Normative Survey method. Various terms used for the latter. Three types of information it collects. Its characteristics. Its significance. Its kinds: various bases of classification. Educational surveys—school surveys (agencies, scope, purpose): survey testing (achievement, intelligence and personality); school appraisal; status studies; financial studies; curriculum studies; building surveys. Documentary Frequency Studies: kinds—text book analysis; analysis of large bodies of literature ; curriculum analysis; job analysis; analysis of assembled specimens—purposes and sources of data. Survey Appraisal Studies: characteristics and uses. Follow-up Studies: purposes and tools. Sample Surveys: advantages; methods; steps of procedure; characteristics of a good sample; use of Probable Error formulae.

While historical studies discover, describe and interpret what existed in the past, there are other kinds of investigations which study, describe and interpret what exists at present. They are concerned with conditions or relationships that exist, practices that prevail, beliefs, points of view or attitudes that are held, processes that are going on, effects that are being felt or trends that are developing. The literature of such investigations includes expressions like *descriptive, survey, normative, status* or *trend.* The terms *survey* and *status* suggest the gathering of evidence relating to current conditions. The term *normative* implies the determination of normal or typical conditions or practices. The term *normative-survey*, is generally used for the type of research that we intend to consider here—the research which proposes to ascertain what is the normal or typical condition or practice at the present time.

The normative survey type of research is not peculiar to education or to other social sciences. It is a significant mode of attack in any field of knowledge where geographic distribution is involved or where the objects of any class vary among themselves, *e.g.* in studying the climatic conditions of various

parts of the world, or the distribution of natural resources.

The survey approach to educational problems is one of the most commonly used approaches. It is followed in studying local, as well as state, national and international aspects of education. It goes beyond mere gathering and tabulation of data. It involves interpretation, comparison, measurement, classification, evaluation and generalization—all directed towards a proper understanding and solution of significant educational problems. There are any number of questions that arise concerning current conditions in the educational world. For example, one may ask : What kind of curriculum do people really want their children to have? At what age and grade level do pupils leave school? What happens to children after they leave school? What higher institutions or vocations do they enter? What is the average achievement-level of school children in particular subjects at various grades in different schools or in different states? How do the private schools compare with government schools in their educational outcomes?—and so on. Such information is important for administrators, teachers and educational-planners alike. It brings into the focus of our attention existing educational problems and also suggests ways of meeting them. Worthwhile survey studies collect three types of information :

(*i*) of *what exists* by studying and analysing important aspects of present situation ;

(*ii*) of *what we want* by clarifying goals and objectives possibly through a study of the conditions existing elsewhere or what experts consider to be desirable; and

(*iii*) of *how to get there* through discovering the possible means of achieving the goals on the basis of the experiences of others or the opinions of experts.

Characteristics

Some characteristics of the Normative Survey Research may be listed below :

1. It gathers data from a relatively large number of cases.
2. It is essentially cross-sectional, mostly of the *what exists* type.
3. It is concerned not with the characteristics of individuals but with generalized statistics of the whole population

or a sample thereof.

4. It is an important type of research involving clearly defined problems and definite objectives. It requires an imaginative planning, a careful analysis and interpretation of the data and a logical and skilful reporting of the findings.
5. It does not aspire to develop an organized body of scientific laws but provides information useful to the solution of local problems. It may, however, provide data to form the basis of research of a more fundamental nature.
6. Surveys vary greatly in complexity, some concerning themselves only with the frequency count of events, while others seek to establish relationship among events.
7. Surveys may be qualitative or quantitative. At one level survey or status studies may consist of naming and defining constituent elements of various phenomena, *e.g.* the qualities of a good teacher. At another level they may involve ascertaining the amounts of constituents or characteristics.
8. Descriptions may be either verbal or expressed in mathematical symbols.
9. The great range of phenomena forming the subject of educational surveys may be classified as:
   (*a*) Physical conditions related to learning (building, furniture and libraries, etc.)
   (*b*) Behavioural conditions related to learning (behaviour of pupils, teachers and parents, etc.)
   (*c*) The results of learning or the pupils' ability to learn (achievement of basic skills, information or attitudes).
10. It fits appropriately into the total research scheme or the stages in exploring a large field of investigation. It may (*a*) serve as a reconnaissance or getting acquainted stage of research in entering a new area, or (*b*) represent a specific interest in current conditions within a field that has long since been explored and developed by research.

Significance

Scientists do not generally regard the normative survey

investigations as research of high order. But the type of information the normative survey method procures is in wide demand and is capable of rendering important service because

1. It determines the present trends and solves current practical problems.
2. It secures historical perspective through a series of cross-sectional pictures of similar conditions at different times.
3. It suggests the course of future developments. Although it is not notably forward-looking but it does tend to focus attention on needs, to reveal practices which are well above average, and to give pertinent data to persons who are forward-looking and are engaged in planning for the future.
4. It helps fashion many of the tools with which we do research, *e.g.* in the development of instruments for measuring many things in quantitative research as well as various data-gathering instruments like checklists, schedules, score cards and rating scales.
5. It contributes to advancement of knowledge because it affords penetrating insight into the nature of what one is dealing with. For example, by studying children of different ages we can differentiate our findings according to age and obtain some picture of the trend of development.
6. It provides the background ideas and data from which many more refined laboratory or controlled studies of causal relations are made.

Kinds of Normative Survey Research

Normative survey investigations may be variously classified on the basis of the fields they study, the purposes they achieve, the geographical areas they cover, or the techniques they employ. According to the fields of study, we come across social surveys, commercial surveys, community surveys and educational surveys. We are concerned here with the normative surveys in the educational field which may be classified further according to

(*i*) *the major aspects of the school systems they study:* school plant, educational programme, educational outcomes, behaviour and attitude, etc.

(*ii*) *the geographical areas they cover:* local, state, regional, national or international.

(*iii*) *the levels of instruction they investigate into:* nursery, elementary, secondary and higher.

(*iv*) *the type of preparation they aim at:* general, teacher-training, engineering, medicine, law or social work.

(*v*) *the purpose they fulfil:* follow-up youth out of school, describe the membership of an educational organization, describe the characteristics of a group of institutions, poll the opinions of a group of parents, identify trends or engage in survey testing or educational appraisal.

(*vi*) *the data gathering techniques or procedures employed :* questionnaire, interview, observation, testing, sociometrics, rating and ranking.

We will now consider in some detail educational surveys of different types current in the educational world.

1. School Surveys

It can be well said that no other unified undertaking so fully represents the normative-survey method of research in all its various phases as does the school survey.[1]

School surveys of the comprehensive type cover such aspects as:

1. Aims, outcomes, pupil achievement, curriculum, methods and instructional aids.
2. Administrative problems and procedures.
3. Financial policies and procedures.
4. Operation and maintenance of the physical plant and related factors.
5. Pupil transportation.
6. Staff and personnel.

Some school surveys may be concerned with the problem of school building only. They study community and school setting, estimate further school enrolment, school plant planning, pupil transportation system, available financial resources for buildings, etc. Other surveys may concern themselves with the directly educational problems of instructional programme—aims and objectives, curriculum and methods, aids, activities and achievement.

[1] C. V. Good, A. S. Barr and Douglas E. Scates, *Ibid.*, p. 454.

A school survey is commonly conducted in order to determine the services that a school can render a community and perhaps to compare these services with those that are provided by other schools. The ultimate aim of all school surveys is educational progress which they achieve by focusing attention on unfulfilled needs or unrecognized evils of a school system on the one hand and on worthwhile practices on the other. They appraise the efficiency of a system and of the personnel and help in determining the next desirable steps. Though employing procedures and tools (score card and checklist, etc.) which are not highly objective, and which involve a considerable element of subjectivity or personal reaction, school surveys, yet, have real strength and value as they focus personal opinion and reactions on the important problems of a school.

School surveys have been sponsored and undertaken by a variety of groups and organizations like local or district boards of education, state or national committees of education, departments of education, and the like. An individual investigator, working alone, can seldom attempt comprehensive school survey except in a very small school system. However, many researchers have worked out worthwhile functional types of theses and dissertations through participation in comprehensive, educational or school-plant surveys.

Large and varied as the scope of school survey is, a single comprehensive school-survey may be constituted of various parts or constituent surveys. The following are some such important parts of school surveys:

(*i*) Survey testing: (*a*) Achievement Testing,
(*b*) Intelligence Testing,
(*c*) Personality Testing.

(*ii*) School Appraisal.
(*iii*) Status Study.
(*iv*) Financial Study.
(*v*) Curriculum Study.
(*vi*) Building Survey.

Achievement Testing

Survey testing of educational attainment has become a large and well-established part of school surveys. Achievement tests of the objective type are being, and have been, constructed for

the purpose by various agencies. They are based upon the current courses of study adopted by the schools within the area or system under investigation and may cover any or all subjects and grades. It is not a routine administration of such tests but their use in the thorough analysis of some important problem which constitutes research of an important kind. Such achievement-testing surveys may serve many a purpose :

(*i*) They may enable the superintendent to compare the performance of present pupils with that of the previous years', or of different schools, and may in the case of unsatisfactory performance lead to an investigation of the causes of and remedies for inadequate attainment.

(*ii*) They may be taken as suggestive, if not a very reliable evidence, of the quality of teaching.

(*iii*) They may be used as one of the means of rating different educational institutions.

(*iv*) They may form a part of large, complex studies of other types than survey, *e.g.* in experimental and complex-causal studies.

(*v*) Principals and teachers may use the result of city or state-wide survey-testing for a critical analysis of their own schools and classes.

A number of regular achievement-testing programmes covering large areas such as states, regions or country as a whole, is an important feature of educational research carried on in the U. S. A. Several agencies conduct achievement-testing even on a national scale. The European countries—England, France and Germany, etc.—do not share the American attitude toward achievement-testing to any large degree, although they too have utilized survey-testing of achievement for some specific purposes (*e.g.* for selection of candidates for particular courses of study). In India, we are yet at the beginning stage in this field. Many research institutions are constructing adequate achievement tests for the purpose of more or less wide educational surveys.

Intelligence Testing

Although used to a much less extent than the achievement tests in school surveys, yet intelligence tests are a very important tool for educational researchers. For the purpose of

large group studies of the survey type, the intelligence tests used are invariably group tests—verbal or non-verbal, or both. The many purposes for which survey intelligence-testing has been used are:

(*i*) for dividing large classes into relatively homogeneous sections;

(*ii*) for diagnosing and adjusting individual children in educational and vocational guidance;

(*iii*) for studying the socially or educationally maladjusted children;

(*iv*) for estimating aptitude, *i.e.* for prognosis;

(*v*) for scientific experimentation and study;

(*vi*) for ascertaining the intellectual level of pupils who enter college, who succeed in school but do not enter college and who do not succeed in school;

(*vii*) for constructing or adopting intelligence tests.

Personality Testing

Among the desired educational outcomes modification of behaviour and formation of desirable attitudes are given an important place. In other words, personality traits are among the most important educational outcomes to be hoped for. Though difficult to define, analyse and measure, they still have given rise to some instruments for survey-testing in the field of personality, character and adjustment which embrace a wide variety of techniques. Questionnaires, interviews, observations, checklists and rating scales, as also some carefully prearranged social situations, are frequently employed in addition to written tests. None of these tools is fool-proof and in interpreting the data collected by any of these the investigator is required to use logical analysis, imaginative interpretation and right judgment.

Personality testing includes:

(*i*) Behaviour studies: centred round measuring such traits as self-reliance, initiative, spontaneity, judgment, co-operation, adaptability, etc. which form no mean goals of education.

(*ii*) Attitude studies : centred round the attitudes of pupils, parents or teachers towards courses of study, activities

in or out of school, professions and problems they may encounter.

School Appraisal

"Appraisal is a form of classification or scaling according to subjective values".[2] It is undertaken for the specific purpose of including the human element in the verdict on schools, because problems of education are fundamentally different from those of physical sciences. It is an attempt to measure not the objective characteristics of a school, but the effect of those characteristics on human beings. Appraisal of different aspects of a school or school system is an essential element in school surveys, It is concerned with both the objective aspects of an educational institution including its administrative provisions and practices and the educational attainments of its pupils. In other words, it takes account of both static and functional data, or of conditions and outcomes. It aims at an evaluation of all the elements in a situation which are significant indicators of good educational influence. To achieve this aim, besides attainment tests, check lists, rating scales, or score cards, the researcher must make use of other lines of evidence such as reputation and subsequent success of the pupils. Many instruments for the purpose of school appraisal have been prepared and used in U. S. A., *e.g.* the check lists by Wade, N. E. A., and Fradrick and Schorling; the score card by Mort and Hilleboe: and the various criteria worked out by accrediting institutions like the North Central Association and others. These emphasize a study of practices and provisions with some attention to pupil results. A series of schedules for evaluating secondary schools in such areas as Agriculture, Art, Business Education, English, Foreign languages, Health and Safety, Home Economics, Industrial Arts, Mathematics, Music, Physical Education, Science, Social Studies, Progress of Studies, Pupil Activity projects, library service, guidance, school plant, school staff and administration, etc. are made available.

School-appraisal surveys utilize in one instance or another the whole range of normative survey procedures including the following:

[2] C. V. Good, A. S. Barr and Douglas E. Scates, *ibid.*, p. 410.

(1) Analysis of available basic data,
(2) Score card and rating scale,
(3) Standard tests,
(4) Case study,
(5) Experimental procedure,
(6) Interview or questionnaire, and
(7) Observation.

The major steps involved in a school survey include:

(1) Preparation of plans.
(2) Preparation of adequate tools—questionnaire, tests, rating scale and score cards.
(3) Gathering data.
(4) Interpretation of data.
(5) Preparing the report.

The whole procedure, however, has to be definitely purposive and not a mechanical application of steps and techniques. Survey must be regarded as a research problem worked out in the field.

Status Studies

Determining the status, including personal and professional characteristics, of various school officials and teachers may be a part of a school study, or subject for independent study. In the U. S. A. independent status studies have been undertaken on a national basis for high school principals, city superintendents of schools, rural school teachers, etc. Similar studies have been made in various States also. Questionnaires are the main means employed by the investigators. Official records are also utilized. The problems of selection and placement of teachers, their teaching load, their status with regard to tenure, health, law, supply and demand, etc. all form subjects of such a study.

Financial Studies

The financial position of a school forms an important aspect of school studies. To ascertain the sources of finance, the items of expenditure, the deficit or indebtedness, expenditure per pupil and the teachers' salaries, etc., questionnaires are used.

Curriculum Studies

As part of a school survey the object may be merely to analyse the existing curriculum in a school system and perhaps to compare it with that existing elsewhere. But if carried on as an independent study it may take a more complicated shape. It may include an analysis of the principles on which the curriculum is based, the needs it fulfils, the form it has taken and the shortcomings it suffers from. The relation to the community it serves may also be determined.

Study of Current Practices

A study of current practices forms another prominent part of school surveys. Practices with reference to school equipment, administration, teacher personnel, classroom teaching, extracurricular activities, etc. are studied. They may form subjects of independent investigations or comparative studies. Methods of teaching, ways of class-organization, use of audio-visual aids and other educational devices are important fields of study and provide interesting and useful data for the solution of educational problems.

Building surveys

Survey of school buildings for the purpose of planning or evaluation, or just for the sake of information, is not an uncommon feature. It usually forms part of comprehensive or wider school surveys. Questionnaire, check list, score card, or observation are the usual tools for collecting data about buildings—their site and location, the accommodation they provide and the arrangement they have for various classes, subjects, activities or staff, the condition they exist in as regards construction and cleanliness, and the improvements or expansions they stand in need of. These studies too may be independent and complete in themselves, or comparative and part of wider school surveys. Building surveys generally deal with the community background and setting of schools, an estimate of future school enrolment, school plant planning, and available financial resources for school buildings.

2. Documentary Frequency Studies

A definitely quantitative type of normative research, *documentary frequency studies* are undertaken to identify and count

certain characteristics found in documents under consideration. They deal with a systematic examination of current records or documents and may merely gather and classify data from such documents or also evaluate the contents according to some established criteria.

A study of this type involves problems

(*a*) of ascertaining the purpose of the study;

(*b*) of determining what characteristics to count and of defining them; and

(*c*) of selecting documentary specimens for investigation.

Documentary studies may serve the following *purposes:*

(*i*) They may describe prevailing practices or conditions.

(*ii*) They may discover the relative importance, or interest in certain topics or problems.

(*iii*) They may discover levels of difficulty of presentation in textbooks or other publications.

(*iv*) They may evaluate element of bias, prejudice or propaganda in textbook presentation.

(*v*) They may analyse types of errors in students' work.

The *sources of data* for decumentary studies may be:

(*i*) official reports and records;

(*ii*) printed forms, textbooks and reference books;

(*iii*) letters, autobiographies and diaries;

(*iv*) compositions, themes or other prepared work;

(*v*) books, magazines, newspapers;

(*vi*) college bulletins, catalogues, syllabi;

(*vii*) pictures and cartoons, etc.

Types of documentary studies are:

(*i*) *Textbook analysis* made to determine the extent to which certain significant objective characteristics occur in a book, or concerned with some features in the content of the book. Studies of vocabulary burden are a popular theme for such analyses. Allied to and based on textbook analysis procedure is the procedure of textbook appraisal.

(*ii*) *Analysis of larger bodies of literature* as to the methods or techniques. It is employed with regard to certain problems or topics in an extensive body of literature on a subject.

(*iii*) *Curriculum analysis* in terms of frequency analysis of social activities, interests and needs.

(*iv*) '*Job-analysis*' or 'activity analysis' in particular professions and occupations.

(*v*) *Analysis of assembled specimens :*

(*a*) *Vocabulary analysis,* the studies of the writings of certain groups of individuals to ascertain common basic vocabulary or spelling achievement.

(*b*) *Error Studies* concerned not with the frequency of use but the frequency of errors made in usage. These are also based on the analysis of informal writings of individuals. They are devoted chiefly to language in its various phases—spelling, punctuation, grammar, sentence structure, speech, etc. Arithmetic, Geography and modern foreign languages lend themselves, to this kind of studies due to their 'usage' fields.

(*c*) *Analysis of characteristics of school records and reports* are also based on collected specimens which constitute an important phase of administration as well as instruction. They determine the extent to which certain items or characteristics that appear in the forms of, and the extent to which they are present in, various schools.

3. Survey-Appraisal Studies

Appraisal studies of certain aspects of existing educational phenomena like schools, students, teachers, textbooks, etc. are also of the normative survey type. Survey appraisal studies lean more heavily upon the human element than surveys of other types, especially because appraisal is itself an attempt to determine the effect of characteristics upon human beings.

Studies that involve direct judgment commonly use the *jury technique* whereby the judgment (rating or ranking) of a number of persons with regard to certain persons, features or specimens, is pooled to secure a final verdict. Check-lists, attitude scales, scaled specimens, rating scales, score-cards and index numbers are all tools commonly used for the purpose of appraisal. These appraisal instruments are based on two fundamental assumptions. One assumption is that better judgments can be

secured on the significant aspects of an object or situation by focusing attention on one aspect at a time. The other assumption is that a general value can be approximated by assumption of the value of parts. In so far as both these assumptions are open to doubt and criticism, these instruments of appraisal fail in being perfect. Yet, they are not without their use. "After all appraisal schedules are normative instruments, they reflect general tendencies, tempered by the superior and by the inferior, but they represent in the main the things we are most used to."[3]

4. Follow-up Studies

Follow-up studies form another type of normative survey investigations which study individuals who have left an institution after a course of study or programme of work. They concern themselves with engagements, occupations and status of the individuals subsequent to their study and the impact of their previous institution and programme upon them. They examine the *status* of those who have passed out of an institution or seek their *opinions* directly as to the value of the courses, experiences or treatments received at the institution.

Follow-up studies may serve the following *purposes* :

1. They may prove the adequacy or otherwise of the institution's programme of work.
2. They may lead to the improvement of the curriculum, syllabus, methods of teaching, administrative procedure, guidance and service, etc.
3. They may provide valuable information on the process of selection and recruitment of candidates for a course.
4. They may evaluate the influence of certain psychological, social or educational factors found among youngsters on their after-life.

The various tools used singly or in combination in follow-np studies are : questionnaires, checklists, rating scales, attitude scales, score-cards or interview and observation.

5. Sample-Surveys

During recent years *sampling* has been increasingly used in education to ascertain information necessary in answering certain questions about a specific population. William G.

[3] C. V. Good, A. S Barr and Douglas E. Scates, *ibid*,p. 439.

Cochran, while discussing the advantages of the sampling method in surveys, writes :

> In every branch of science we lack the resources to study more than a fragment of the phenomena that might advance our knowledge.[1]

He analyses four principal advantages of sampling as compared with complete enumeration. They are :

(*i*) reduced cost,
(*ii*) greater speed,
(*iii*) greater scope, and
(*iv*) greater accuracy.

In the field of education normative surveys of various types (described above) are usually sample surveys. That is, they usually define and measure the properties of an accurately defined population by means of the information obtained from a sample thereof. Until recently, relatively little attention was given to the problem of how to draw a good sample. This does not matter so long as the material from which we are sampling is uniform, so that any kind of sample gives almost the same results. But in the field of education material is usually far from uniform so that the method by which the sample is obtained becomes critical.

Principal methods of sampling

To obtain a sample representative of its population four main techniques have been devised : *random, stratified or quota, incidental,* and *purposive.*

Random sampling

Sometimes termed as *simple random sampling,* sometimes as *unrestricted random sampling,* and sometimes as just *random sampling,* this form of device is one in which every single unit of the population has an equal chance of being selected. A simple random sample is drawn unit by unit. The population is numbered from 1 to N and a series of random numbers is drawn either by means of a table of random numbers (*e.g.* the Fisher-Yates table of random numbers made up of 300 blocks 25 numbers each printed on pages of 10 rows and 5 columns each. For using it, one can begin at any point on any page and read in any direction, in order, and choose the required

[1] William G. Cochran, *Sampling Techniques.* Bombay: Asia Publishing House, Asian Students' Edition, 1959, p. 1.

number of units to form 'n') or by placing the numbers (1 to N) in a bowl, mixing them thoroughly and drawing 'n' numbers in succession. A number which has been drawn from the bowl is not replaced to ensure that the same number does not occur twice in the sample. Similarly, in using a table of random numbers, a number which has been drawn earlier is ignored.

Stratified or Quota sampling

A modified form of random sampling, *stratified* or *quota sampling*, sometimes called *controlled sampling*, is a device which ensures representativeness in selecting a sample from a population composed of subgroups or *strata* of different sizes. A good sample from such a population needs to contain individuals drawn from each category in accordance with the sizes of the subgroups. Within each subgroup the sampling is random.

In stratified sampling, the population of N units is first divided into different strata—N_1, N_2 . . . units respectively and then a sample is drawn from each stratum. The sample sizes within the strata are denoted by n_1, n_2 . . ., respectively.

Incidental sampling

Incidental, or sometimes called *accidental sampling*, is a term which is applied when such groups are used as samples as are easily available, *e g.* children in a school, an orphanage or a reformatory, students enrolled in particular classes, etc. The number and conditions of these groups are not chosen specifically for the purpose.

Such groups are but poor samples of any definable population and adequate generalizations can hardly be based upon such data.

Purposive Sampling

As different from incidental sampling, purposive sampling is the device which selects a particular group or category from the population to constitute the sample because this category is considered to mirror the whole *with reference to the characteristic in question*. For example, purposive sampling is used when the selected sample is constituted of all the newspaper editors of an area to represent the public opinion of that area. In this type of selection the sample is restricted to units considered

by someone to be especially typical of the population.

The principal steps in a sample survey

The steps that are usually involved in the execution of a survey of any type are :

(*i*) Statement of the objectives of the survey.
(*ii*) Definition of the population to be sampled.
(*iii*) Determination of the data to be collected.
(*iv*) Selection of the methods of data collection.
(*v*) Choice of sampling unit.
(*vi*) Selection of the sample.
(*vii*) Organization of the field work.
(*viii*) Summary and analysis of data.
(*ix*) Preparation of sampling survey report.

Characteristics of a good sample

A good sample of a population is the one which, within restrictions imposed by its size, will reproduce the characteristics of the population with the greatest possible accuracy. That is to say, a good sample should be free from

(*i*) error due to bias, and
(*ii*) random sampling error.

To select a good sample for any purpose, therefore, one should avoid such faulty methods as the following :

(*i*) Deliberate selection of the units of the sample.
(*ii*) Selection by a procedure where there is a connection between the method of selection and the characteristic under consideration.
(*iii*) Substituting one unit (included in the sample but found not available) by any other more convenient one.
(*iv*) Incomplete coverage of the units selected for study, *i.e.* ignoring the failures in the sample in responding to the study.

However, it is found that even if the procedure of selection follows the canons of random sampling process, the sample cannot be exactly representative of the whole population. The inevitable errors resulting from the process are called *random sampling errors* and *Probable Error formulae* are the statistical devices to calculate the amount or probability limits of such errors. The amount of probable error can be reduced by increasing the size of the sample. Thus, for increasing the

accuracy of the sample, besides excluding all bias in selection, increasing the size of the sample is the simplest means. In the interpretation of the results, and, in reaching conclusions, the use of appropriate Probable Error formulae for particular statistics becomes essential. These formulae, however, fail to indicate anything reliable if applied to data secured from a biased sample.

SUMMARY

1. The method of research which concerns itself with the present phenomena in terms of conditions, relationships practices, beliefs, attitudes, processes. effects or trends is variously termed as *descriptive, survey, status, normative* or *trend* study. The use of the term *normative-survey* is more generally adopted than the others,
2. Normative-survey research collects three types of information—of what exists, of what we want, and of how to get there—and is, thus, highly purposive.
3. It distinguishes itself by gathering data from a relatively large number of cases, by being cross-sectional, by concerning itself with general statistics of a population or a sample, by serving as the basis of fundamental research, by possessing various degrees of complexity, by being both qualitative and quantitative and by having a great range of phenomena as its subject. It has proved itself of great value in advancing knowledge.
4. General normative-survey researches may be classified into various categories on different bases, and so also the educational surveys. Main among the different types of educational surveys are :
   (*i*) School surveys—comprehensive or otherwise—including survey testing, school appraisal, financial studies, curriculum studies and building surveys, etc. carried out to serve various ends, using various tools.
   (*ii*) Documentary-Frequency studies, including textbook analysis of large bodies of literature, curriculum analysis, job-analysis and analysis of assembled specimens, serving many purposes and having many sources of data.
   (*iii*) Survey-Appraisal studies to evaluate various aspects of

current education.

(*iv*) Follow-up studies concerning themselves with individuals after they have left an educational institution, serving many purposes.

(*v*) Sample-surveys of educational phenomena, utilizing the techniques of random, stratified, incidental or purposive sampling, requiring great caution, systematic planning, proper execution and interpretation, and the application of probable error formulae for serving as the basis of generalizations.

QUESTIONS AND PROBLEMS

1. How would you justify the inclusion of such varied types of research as school appraisal studies, survey testing, documentary analysis, and follow-up studies under Normative Survey research? Explain the reasons with reference to the significant characteristics of Normative Survey research.
2. Select five important topics for Normative-Survey research in our country and state how their solution will help in solving some current educational problems.
3. Draw an outline plan for research in any one of the topics selected for Normative-Survey research (Q. 2) and describe clearly the procedure you would adopt in carrying it out.
4. What are sample-surveys? Why is it necessary to restrict most of our normative researches to the study of samples only? What are the main methods of selecting good samples?
5. Consider an adequate topic for an educational sample survey and define it clearly. What precautions would you take for securing reliable results from which you could draw trustworthy generalizations?

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CHAPTER TEN

Methods of Educational Research—C
The Experimental Method

Definition and characteristics of the Experimental Method. Its development; uses, limitations and major steps. Bases of classification. Three main types of experimental designs—One-group, equivalent group and rotation group. Practical hints for experimental researchers.

Experimentation is the name given to the type of educational research in which the investigator controls the educative factors to which a child or group of children is subjected during the period of inquiry and observes the resulting achievement.[1]

Experimental research is the description and analysis of what will be, or what will occur, under carefully controlled condition.[2]

The experimental method in educational research is the application and adaptation of the classical method of the science laboratory. It is the most exacting and difficult of all methods and also the most important from the strictly scientific point of view. The main features of experimental method are:

1. Its basic assumption rests on J. S. Mill's law of the single variable which states that if two situations are similar in every respect, and one element is added to or subtracted from one but not the other, any difference that develops is the result of the operation of that element added or subtracted. Experimentation, therefore, involves an attempt to control all essential factors save a single variable which is manipulated with a view to determining and measuring the effect of its operation. This procedure is distinctly different from the historical and the normative survey methods.

2. Now a frequently used procedure in educational research, it has been applied with considerable success in the classroom where within certain limits, significant factors or conditions can be controlled.

[1] W. S. Monroe and M. D. Engelhart. Quoted by Carter V. Good., A. S., Barr and Douglas E. Scates, *ibid.*, p. 485.
[2] John W. Best, *ibid*, p, 125.

3. Since in the field of education complex human beings are the subjects and since it is unlikely that all variables can be successfully controlled, experimentation is not a perfectly precise method. The experimental findings in education are somewhat inexact because some variables (like teacher's enthusiasm for or competence in using a particular method or material, regularity of attendance, mental or emotional state of the child determined by any number of factors) are extremely difficult or even impossible to control. The basic condition of *other things being equal* is difficult of fulfilment in educational research.

4. Most classroom experiments have attempted to eliminate one or more of the variables of age, achievement, intelligence, or reading ability, social status and race, etc. Experiments often have to be conducted using intact, existing groups, trusting that the variables not controlled are irrelevant or insignificant for the purpose of the study. The control group and the experimental group are never as identical as they ought to be for an exact experiment.

5. The concept of educational experimentation has developed since the beginning of the last decade of the 19th century and interest in the experimental method of research in education has made rapid progress in the last fifty years or so. Wundt was the first to study experimentally the learning process and clarify and define learning patterns.[3] Ebbinghaus invented methods of measuring association and memory in 1880's, and his studies as well as of some others, in memory, puzzle-learning and in the acquisition of skills affected teaching techniques. More recently the experimenal work of Thorndike, Judd and Freeman has paved the way for further experimental research in education. The beginning of strict educational experimentation may be found, however, in the work of Rice and Cornman during the last decade of the the 19th century who made studies of spelling achievement among students.

6. Experimentation in education has been put to various uses, main among which are:

(i) to determine and evaluate the adequacy and effectiveness

[3] Wundt had set up a Psychology laboratory at Leipzig in 1879 where he studied learning patterns.

of educational aims and objectives through the measurement of outcomes;

(*ii*) to serve as basis for the formulation, execution and modification of educational policies and programme; and

(*iii*) to ascertain the effect of any change in the normal educational programme or practices.

7. Experimental studies in education though never strictly empirical, can yet approximate strictly empirical research in many areas. For example, the teaching of spelling through different methods, finding out the superiority between the authoritarian and the democratic set-up in education, and finding out how far, if at all, the study of one subject improves the achievement in another, are problems which have been handled in a scientific way through the experimental approach. But there are areas where a strictly empirical approach is impossible. For example, in finding out whether centralization of educational administration produces better results than local freedom, in deciding if co-education is preferable to separate schools for boys and girls, and in establishing whether certain achievements of education stay when formal schooling stops, nothing more than a partly empirical approach is permissible. In such areas and for solving such problems where we cannot experiment we look out for cases where education goes on under different conditions. We let the reality experiment for us and just watch and study the results objectively.

8. All experiments in education are ultimately experiments with children, *i.e.* human beings, who for ethical reasons must not be subjected to conditions that may harm them. The popular slogan—"No experimenting with children"—may not be wholly justified, but there certainly are boundaries of a moral character for experimentation which must not be infringed.

9. Another difficulty, in principle at least, arises from the fact that educational experiments are carried through with human beings and affect mental processes and attitudes. Gestalt psychology and related research have shown that the introduction of any specific influence, howsoever well and exactly defined, intended to change one specific type of mental process or attitude—will change the 'whole field' of mentality, often in

aspects and ways that escape the control of the experimenter.

10. Major steps in experimental research are three:
    (*a*) planning the experiment,
    (*b*) conducting the experiment and
    (*c*) reporting the results.

Planning the experiment—the first step – includes the following sub-steps:

(*i*) Investigating the needs in the field of education and deciding upon a problem.
(*ii*) Studying the literature related to similar problems.
(*iii*) Determining and delimiting the experimental factor.
(*iv*) Determining the method of experimentation.
(*v*) Formulating an outline or plan of procedure.
(*vi*) Determining the place, time, duration and materials of the experiment.
(*vii*) A preliminary try-out.
(*viii*) Selecting the subjects and groups.

The second major step—*conducting the experiment*—includes the following sub-steps:

(*i*) Controlling variable or non-experimental factors.
(*ii*) Keeping a careful record of steps in the procedure.
(*iii*) Applying the experimental factor or factors.
(*iv*) Measuring the experimental results.
(*v*) Classifying, analysing and interpreting experimental findings.
(*vi*) Verifying the findings.
(*vii*) Drawing conclusions from the findings

The third step involves all the main factors which the reporting of results of any research study does.

Classification of Experiments

Experimental investigations can be variously classified on different bases. The usual bases observed for classification of experiments are :

(*i*) Type of control: scientific or practical, formal or informal, actual or inferred.
(*ii*) Means of approach: analytical, comparative, quantitative or qualitative.
(*iii*) Place where conducted: laboratory, field or classroom.

(*iv*) Grouping of subjects: one-group, equivalent group or rotation group.

(*v*) Treatment of subjects: in groups or individually.

(*vi*) Function or purpose: to study direct effects, indirect effects, or causes.

(*vii*) Time involved: long or short duration.

(*viii*) Sponsorship or investigation agency: independently or cooperatively, by an individual or an institution.

Among the several bases of classification listed above, the most significant, perhaps, is the one which takes into account the grouping of subjects because the design of an experiment is largely determined by this factor. We shall consider here the three major experimental designs distinguished on this basis.

1. *One-group Experimentation*

A one-group experiment involves the application of an experimental factor or factors to an individual or a group in such a way that certain changes in the outcome can be determined. Its main steps are :

(*i*) A group of subjects is measured with regard to certain factors under study.

(*ii*) All factors are kept constant but one which is the *experimental factor* or *the independent variable*.

(*iii*) The experimental factor is applied for some definite period of time.

(*iv*) The group is measured again to determine the changes produced by the experimental factor in the *dependent variable*.

(*v*) Other factors may be introduced, one at a time, and their results determined likewise.

For example, if 'A' denotes the group, 'X' the experimental factor and 'R' the initial result of measuring the particular factor in question, the one-group experiment could be represented graphically thus:

$$[A] \longrightarrow [R] \xrightarrow{X} [R_1]$$

The difference between the initial result (R) and the result achieved after the introduction of the experimental factor (R_1) can be attributed to the experimental factor (X). That is,

$(R_1 - R)$ can be expected to be caused by the application of X over a specified period of time. Similarly, the introduction of other experimental factors (X_1, X_2 . . .) may be calculated to produce $(R_2 - R_1)$, $(R_3 - R_2)$ . . . etc.

This type of simple experimental design has some *advantages* over other complex designs. It is simple to plan and operate. It requires no equation or rotation of groups. It is well-adapted to class-room use and provides a stimulus to better class-room teaching.

One-group design has many *shortcomings* too. It is not always thoroughly valid because of

(*i*) the carry-over effect of attitude or method from one to the other phase of the experiment;

(*ii*) the practice-effect produced by the taking of a series of measuring devices;

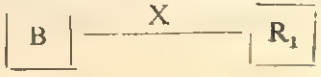
(*iii*) variation in learning speed at various stages of the learning process;

(*iv*) errors due to maturation of children during the course of the experiment, and

(*v*) inequality and lack of comparable units of measurement.

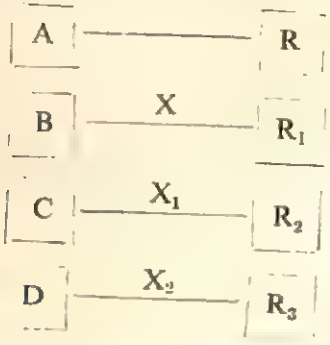
2. *Parallel or Equivalent-Group Experimentation*

This is perhaps the classical experimental design, more complex than the one-group experiment, but more accurate too. In this, two or more groups of subjects equivalent in all significant respects are selected. One of these parallel groups serves as the *control group* and the experimental factor or factors are applied to one or more of the other groups, known as the *experimental groups*, one by one for a specified period of time. The difference observed at the end of the period in the particular factor under study between the control and the experimental groups is expected to be due to the introduction of experimental factor. If 'A' is the control group and 'B' the experimental group, a parallel-group experiment carried out to determine the influence of one experimental factor could be represented graphically thus:



$R_1 - R$ is the result of X, the experimental factor.

In case more than two parallel groups are used to determine the influence of more than one experimental factor, the experimental design may take the following form:



The various steps in a simple experiment of the equivalent group type can be represented thus:

Experiment Group

1. Pretest
2. Application of experimental factor.
3. Final test.
4. Measure pupil mean gain (Final test scores minus pretest scores).

Control Group

1. Pretest
2. Application of control factor.
3. Final test.
4. Measure pupil mean gain (Final test scores minus pretest scores).

5. Calculating the difference between the control pupil mean gain and the experimental pupil mean gain to get an idea of the relative superiority of the control and experimental factor under study.

Thus the *main steps* in the parallel group method are the following:

(*i*) securing equivalent groups,
(*ii*) applying the experimental factor,
(*iii*) comparing the results, and
(*iv*) interpreting and reporting the results.

The initial step of securing equivalent groups is a crucial one due to the varying degrees of inherited and acquired characteristics in the members of any group. The *control factors* usually considered are:

(*i*) chronological age,

(*ii*) sex,
(*iii*) race,
(*iv*) physical condition,
(*v*) intelligence,
(*vi*) previous achievement,
(*vii*) study habits, and
(*viii*) personality traits.

The last two, obviously, do not lend themselves to objective measurement and so are less reliable factors than the earlier ones, although no less important.

Among the many methods of equating groups for experimental purposes, the following devices are frequently employed:

(*i*) Chance or random selection.
(*ii*) Equating on the basis of mean scores and standard deviations.
(*iii*) Equating by matched pairs.
(*iv*) Equating by co-twin method.

It is expected that the device of selecting groups by *random selection* from a large population, should lead itself to formation of groups which are more or less equal in composition. Equating groups on the basis of *equal mean scores*, however, is a more exact method if all the significant factors (age, intelligence, achievement, etc.) are measured. When *standard deviations* of groups are also taken into consideration, the groups are equated on the basis of homogeneity also. Equating by *matched pairs* involves the finding of pairs of pupils whose significant characteristics (age, sex, intelligence, home background, race and personality traits, etc.) approximate closely. One pupil from every selected pair forms the control group and the other pupil from every pair the experimental group. The groups are expected to be parallel on the assumption that the sums of equals are equal. The *co-twin method* is a form of the matched-pair technique by which pairs of identical twins are taken up as subjects. One from each pair of identical twins is placed in the control and the other in the experimental group. This method has, no doubt, been employed for studies of heredity and environment but it is hardly feasible in usual educational situations.

Once equivalent groups are secured, one experimental factor has to be applied on one (or more) of the groups while one group has to work under normal conditions. The two or more equivalent groups are thus ensured identical treatment in all respects but the experimental variable or variables. Control of all significant variables and the application of the experimental variable has to be done for a particular period of time, divided into preplanned units, at previously determined intervals, under uniform conditions. At the end of the planned period results of both the control and the experimental group or groups are measured through proper tools.

The results secured at the end of the experiment have to be compared. The differences found in achievement at this stage are supposed to be largely due to the experimental variable. But one cannot interpret the differences and come to certain conclusions on their basis so easily. The interpretation and conclusions have always to take into consideration, and discount to the extent, that all variables were not equated. In the report of an experimental study not only the obvious results but also the limitations of the devices employed of equating and testing the groups have to be indicated. Appropriate statistical devices have to be applied for interpreting the differences in the results of the two or more groups and for finding out their levels of significance or reliability limits.

The main advantage of this type of experimental design is that it is free from the weaknesses of the one-group method. Both the control and the experimental factor or factors are applied simultaneously on different groups so that the difficulties due to maturation or practice effect, etc. do not arise. But this method suffers from the difficulty of equating groups and controlling significant variables, and from many administrative problems of reorganizing classes.

3. *Rotation Group Experimentation*

This experimental design may be looked upon as a variation of either the one-group or the equivalent group method. If applied to a single-group, it involves changing the time sequence of the experimental and control units in two or more cycles.

Cycle I would apply the control factor first, then the experimental.

Cycle II would apply the experimental factor first, then the control.

When applied to the equivalent groups it involves exchanging the factors between different groups cycle-wise.

Cycle I Group A—experimental factor
Group B—control factor

Cycle II Group A—control factor
Group B—experimental factor.

If more than two factors have to be made the subject of study, more than two groups will have to be employed and number of cycles, at least equal to the number of groups employed, have to be observed.

Thus, the rotational method involves the rotation of instructional factors of the experimental and control groups at equal intervals. The measurement of influences is done factor-wise by adding up the results after the introduction of individual factors. Supposing 'X' is the experimental factor and 'Y' the control factor, the rotation group method with Group A and B will take the following form:

Cycle I: A—X→R
B—Y→R_1 } ($R + R_3$) is the result of X

Cycle II: A—Y→R_2
B—X→R_3 } (R_1+R_2) is the result of Y
The difference between ($R+R_3$) and (R_1+R_2) is attributable to the difference between X and Y.

More than two groups, more than two factors and more than two cycles will be handled in the same way. For example:

Cycle I: A—X→R
B—Y→R_1
C—Z→R_2

Cycle II: A—Y→R_3
B—Z→R_4 } ($R + R_5+R_7$) is the result of X
C—X→R_5 | ($R_1+R_3+R_8$) " " Y
($R_2+R_4+R_6$) " " Z

Cycle III: A—Z→R_6
B—X→R_7 | The differences between the three above
C—Y→R_8 } results are attributable to the differences between X, Y and Z.

The rotation group method is used to secure control of pupil factors when groups cannot be throughly equated. It also

neutralizes the teacher-variable. In general, it overcomes the chief weaknesses of both the one group and the equivalent group methods. Since in the rotation group design each variable is applied to each group, it is not necessary that the groups be exactly equated. Of the three designs of educational experimentation, this is the most valid but the most complicated too.

Practical hints for experimental workers

While the experimental method is rapidly gaining popularity as a method of research in education, it is yet not perfected to the point where its results may be considered throughly objective and valid. For securing the best results out of this method it is necessary that

(*i*) the experimental researcher be well-trained in the experimental procedure;

(*ii*) the problem in hand be properly analysed and the degree to which experimental conditions can be approached should be calculated to ascertain whether it could not be better attacked from some other angle than the experimental;

(*iii*) the nature and scope of the experimental factor and the dependent variable should be adequately defined;

(*iv*) the measures to be used be reliable and valid;

(*v*) the non-experimental factors should be discovered and properly controlled;

(*vi*) the findings should be interpreted intelligently. Plausible explanations should be made for the results secured giving due consideration to the limitations of the procedure adopted; and

(*vii*) the findings should be verified experimentally.

In brief the research workers using the experimental method must understand the experimental procedure, recognize the limitations and relative merits of all possible available procedures and work with great care.

SUMMARY

1. Experimental research implies the type of scientific investigation in which the researcher controls all significant factors during the period of enquiry and observes the results.

2. Resting on J. S. Mill's canon of the single variable, this method involves the control of all other factors but one which is manipulated in order to determine its effect.
3. The classical method of the science laboratory, it has been adapted for and applied to education within the last few decades with considerable success. But in education, as complex human beings are the subjects, it is found impossible to control successfully all variables that affect the results. Hence this method is not a perfectly precise one when applied to education. Yet, in many educational areas—like those of teaching spellings, of determining the superiority of particular methods of instruction, etc.—experimentation approximates strictly scientific research.
4. Some moral and psychological principles do stand in the way of strict experimentation.
5. Three major steps involved in experimental research, including a number of sub-steps, are:
   (*a*) planning the experiment,
   (*b*) conducting the experiment, and
   (*c*) reporting the results.
6. Experiments in education can be classified on various bases, the grouping of subjects being the main one. On this basis experiments can be divided into:
   (*i*) One-group experiment,
   (*ii*) Equivalent or parallel group experiment, and
   (*iii*) Rotation-group experiment.

   These three experimental designs suffer from some difficulties and weaknesses, no doubt, but if applied carefully, can lend themselves to satisfactory experimentation in many areas of education.
7. The experimental research worker has to be very cautious and understanding at every stage of his investigation.

QUESTIONS AND PROBLEMS

1. How does the experimental method of research in the classroom differ from:
   (*i*) laboratory experimentation,
   (*ii*) historical research in education, and
   (*iii*) normative survey research in education.
2. Describe the main types of experimental patterns employed in educational research. What are their chief limitations?

3. Enumerate a few problems of Indian education suitable for experimental research. Select any two of them and plan how they should be tackled,
4. Read carefully the report of any experimental study in education and comment on its problem, procedure and findings.

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CHAPTER ELEVEN

Methods of Educational Research—D

Causal-Comparative, Correlation, Case-Study and Genetic Methods

More complex methods of research adapted to the analysis of complex causal relationships: Causal-Comparative Method—purpose; different from the historical, the normative-survey and the experimental methods; its three aspects; two-group and single-group studies; limitations; main requirements. Correlation Method—description; significance; uses; interpretation. Case-Study Method—description and characteristics; purposes; various methods it employs; two types. Genetic Method—purposes; types: longitudinal and cross-sectional.

In the preceding three chapters we discussed three different methods of educational research—the historical, the normative-survey and the experimental. In this chapter we propose to introduce four more complex methods of research devised, lately, to study complex phenomena not only of education but also of other human sciences like Biology, Sociology, Economics and Psychology.

These are:
1. Causal-Comparative Method.
2. Correlation Method.
3. Case-Study Method.
4. Genetic Method.

These new methods involve new purposes in the collection of data and new partners of treatment. They employ either entirely new modes of procedure, or new combinations of old procedures.

The Causal-Comparative Method

The *causal comparative method* seeks to establish causal relationships between events and circumstances. In other words, it finds out the causes of certain occurrences or non-occurrences. This is achieved by comparing the circumstances associated with observed effects and by noting the factors present in the instances where a given effect occurs and where

it does not occur. For example, a researcher using this method may seek to find out the cause or causes of delinquency among children by noting and comparing the hereditary, the social, the intellectual and other factors present or absent in cases of delinquency as well as of normality. This method is, thus, based on Mill's canon of agreement and disagreement which states that causes of a given observed effect may be ascertained by noting elements which are invariably present when the result is present and which are invariably absent when the result is absent.

The causal-comparative approach differs from the historical, the normative survey and the experimental in various respects. Historical research may also seek to find out the causes of events, but while historical research finds out the causes of past events, the causal-comparative deals with the present events only. Normative-survey deals with present events, no doubt, but unlike this method, it is mainly concerned with status and trends, not the causes of educational effects. This method differs from the experimental procedure in that it does not control the variable factors. It, instead, makes observations under normal field conditions and discovers the causes of observed phenomena. It may be taken to be a sort of *uncontrolled experimentation.* It is admirably suited to many types of field studies seeking to establish causal connection but not permitting experimentation proper due to many reasons.

Three important aspects of the causal-comparative method are :

(*i*) gathering of data on factors invariably present in cases where the given result occurs and discarding of those elements which are not universally present;

(*ii*) gathering of data on factors invariably present in cases where the given effect does not occur; and

(*iii*) comparing the two sets of data, or in effect, subtracting one from the other to get at the causes responsible for the occurrence or otherwise of the effect.

This method may achieve its purpose by having either two groups, or a single group for its subjects. Some Illustrations of studies which have used the causal-comparative method with

two groups of subjects are:

(*i*) Study of differences in the teaching of effective and ineffective teachers of secondary schools.

(*ii*) Study of motor factors.

(*iii*) Study of typical differences between bright and dull pupils.

(*iv*) Unevenness of abilities in dull and bright children.

(*v*) Qualities of merit possessed by superior and inferior teachers.

Examples of causal-comparative studies using only a *single group of subjects* are:

(*i*) A study of the significance of certain mental and physical character traits for success in High School.

(*ii*) Causes of proor attendance.

The causal comparative method of research suffers from some *limitations*, the main among which are:

(*i*) It is essentially dichotomous and ignores the fact that results and causes both exist in varying degrees. They are not always either absolutely present or absent.

(*ii*) Many important causes and results occurring in moderate degrees are thus ignored.

(*iii*) It is not well-adapted to the study of individual cases. Rather, it necessitates observation of many cases arising from a large variety of circumstances.

For a successful study of this type one needs careful observation, insight, thought and work. A very cautious interpretation of findings is also necessary as there are no absolute causes of social effects. Many factors enter into a complex pattern of relationships.

The Correlation Method

The *correlation method* of research does not denote merely a statistical device of calculating coefficients of correlation between certain data. On the other hand, it is a research approach, which analyses the relationship between data, between variables and some results in such a way that the underlying pattern of relationships becomes clear. No doubt, this method utilizes the correlation technique of analysis. But it goes far beyond it and includes many other elements

of a basic nature.

The correlation method is of modern origin, ranked high among research methods in education. Its place in sociological research is almost the same as that of the laboratory method in physical science research. This method is a definite improvement on the causal-comparative and the experimental methods. It approaches the problem of cause and effect in terms of degrees, not only dichotomies. It deals with problems in terms of many variables and reflects the variation of many factors at once. It does away with the necessity of strict experimentation and its data approximate reality more easily than those of experimental procedures.

The correlation method has been put to *various uses*, chief among which are:

(*i*) *to measure the strength of association* or the degree to which variation in one factor, or set of factors, is associated with variation in others. Variation between one factor and another may be positively, or negatively correlated, from +1, through Zero, to −1.

(*ii*) *To predict scholastic success* by utilizing available data, or special data from the use of aptitude or prognostic tests. The prediction, of course, is not individual but average prediction.

(*iii*) *To predict teaching success* and select teachers according to a composite criterion of teaching success secured through the technique of multiple correlation which takes account of many variables at once.

(*iv*) *To predict school population* which is a necessary aspect of educational planning.

(*v*) *To help in fundamental research* through (*a*) the construction of data-gathering tools (e.g. tests), and the determination of their reliability and validity; (*b*) factorial analysis, *i.e.* an analysis of the composition of some psychological phenomenon like intelligence.

The correlation method involves all the steps that are involved in other kinds of research. It requires for its material quantitative data in the form of scores in respect of different variables under consideration. These scores are analysed through various statistical devices of finding out measures of relationship between different sets of data. The *interpreta-*

tion, however, of the calculated coefficients of correlation some presents difficulties. A researcher has to keep in mind many things while interpreting his coefficients of correlation. Chief among those are the following.[1]

(*i*) Coefficients of correlation do not represent percentage of any thing. They are pure mathematical symbols and should never be mistaken for anything else.

(*ii*) They are not to be interpreted in a linear sense, *i.e.* .80 should never be taken to be twice as big as .40.

(*iii*) Errors of measurement are important factors and should always be discounted for.

(*iv*) Size of *r* depends largely on the range of measurements used in the calculation.

(*v*) Allowance must be made for a sampling variation in the magnitude of *r* through calculating the Probable Error.

(*vi*) A big *r* between factors may, in social science, denote only concurrence—not causation necessarily. Partial Correlation and Analysis of Variance might be useful devices in such cases.

The Case-study Method

The *case-study method* has come to be recognized as a useful mode of investigation into the causal relationships of complex educational phenomena. Originally a method in medicine, it led the physician to include, in the study of his 'case', the patient's previous development, his health and physical state from the beginning and many other factors in the past, besides making a careful examination of the patient's present condition and symptoms. In education, likewise, the exceptional child, the blind, the deaf, the mentally defective, the delinquent and the truant, etc. are being studied through a similar approach.

The basic unit of a case-study is a *case*—a particular one of its kind. It may be a human being, a whole group of individuals, a nation, a race, or even an epoch in history. In the field of education *cases* are mostly individual persons, communities and institutions. An important source of educational ideas, this method is usually employed in studying *problem* cases, maladjusted pupils and scholarship difficulties, etc. rather than

[1] Good, C. V., A. S. Barr and Douglas E. Scates, *ibid.*, pp. 560.562. Read for further discussion.

normal cases. The case-study method may also be used in studying the general characteristics of phenomena of any given class, *e.g.* case studies of the scholarship difficulties of secondary school pupils, or the teaching difficulties of beginning teachers. Used primarily for the purpose of correcting conditions of maladjustment, this method, however, is found to be useful for making case-studies of normal and well-adjusted individuals or situations also. The findings of such studies form the basis for guidance in preventing maladjustments. This is in keeping with the trend towards preventive rather than corrective medicine. Thus, case-studies in education are broadly of two types :

(*i*) those which determine the antecedents of some particular abnormal instance or phenomenon, and

(*ii*) those which are made to discover circumstances common to a number of instances of some condition—normal, or otherwise.

A case-study has to pass through several stages before it can achieve its purpose. The *various steps* involved in any case-study may be analysed thus :

1. The first step is to determine the status of the phenomenon under investigation through direct observation or measurement. For example, to make a case study of a maladjusted pupil or a run-down school system, the first thing the investigator has to do is to survey the present status of the pupil or the school-system. The many instruments utilized for normative-survey research are used singly or in combination at this stage.
2. The next step is to determine the most probable antecedents of the case and to formulate a definite hypothesis or set of hypotheses through a knowledge of similar cases. For example, one can formulate a hypothesis that the occurrance of maladjustment in a pupil or a group of pupils is due to faulty home environment, poor school environment, or defective play-life, etc. History is, thus, the main source of data at this stage.
3. After the formulation of hypothesis comes the stage of verifying the hypothesis. The case is then checked for the presence or absence of the antecedents supposed to

apply to the situation under investigation. This going beyond the hypothesis stage is achieved through a use of the knowledge of status and history of the case. Many personal documents like biography, autobiography, diaries, letters, records of dreams, etc. are useful sources. Direct observation, interview, objective tests or other measuring devices and cumulative and anecdotal records, etc. are often employed to secure necessary data. If the hypothesis is verified through the secured data, the next step follows. If it is rejected, a fresh start has to be made through the formulation of another hypothesis.

4. The next step after the verification of the hypothesis is directed towards a further validation of the diagnosis. This is achieved through the remedial step of removing the causes found out and through making necessary adjustments. The effect of the changes introduced thus is observed carefully.
5. Follow-up of the case is the last step. The phenomenon under study is remeasured after a significant period of time to ascertain if any changes have been produced or not, by the modifications introduced. If the change is a positive one, and quite significant in amount, the diagnosis is taken to be correct.

Characteristics of a good case-study

For a good case-study, *i.e.* for a case-study which achieves some definite, useful purpose, the following requirements should be fulfilled :

(*i*) completeness of data,
(*ii*) validity of data,
(*iii*) continuity,
(*iv*) confidential recording, and
(*v*) scientific synthesis.

The Genetic Method

The *genetic method* of research in education, as in other fields too, is applied principally to long-time investigations of biological or psychological phenomena to study the changes, growth and development in these phenomena. This method differs from the *case--study approach* in so far as the latter

(*i*) involves a shorter segment of the life-span of some

subject, group or institution ;

(*ii*) is primarily aimed at discovering cause and effect relationship ;

(*iii*) tends to be limited to the study of a typical or abnormal life ;

while the *genetic method*

(*i*) involves a long span of life ;

(*ii*) is not concerned so much with cause effect-relationship as with recording the developmental changes over a considerable period of time ; and

(iii) is more generally devoted to the study of normal life processes.

However, it is realized that the genetic method, in the broader sense, must include as its purpose developmental diagnosis, *i.e.* the study of cause and effect relationships, too, and thus achieve a common end with the case-study. The genetic method, to achieve its various objectives, employs a variety of methods—the historical, the normative-survey, the experimental, the case-study and the correlation. Yet it maintains its position as a distinct method of research by virtue of its purposes, pattern of organization and total structure of methodology.

Purposes

The genetic method serves a number of purposes, chief among which are:

(*i*) securing a faithful record of past events in the developmental history of individuals or groups under investigation ;

(*ii*) discovering principles of development and common features in the history of individuals or groups ;

(*iii*) determining changes in interests, capacities and abilities from one age level to another among individuals as well as groups ;

(*iv*) finding out cause and effect relationships among phenomena ; and

(*v*) securing age-grade norms of development for groups of children.

Types

The genetic research may take two different forms—*longitudinal* and *cross-sectional.*

(*i*) The *longitudinal approach* consists in repeated observation and measurement of the same child or group over a period of years. It is a kind of *extended case-study*.

(ii) The *cross-sectional approach* consists in a *series of parallel case-studies*, not conducted so much to understand the individual case as to discover common features among particular levels of children.

The longitudinal type of genetic research is not uncommon, but it is being applied more in the clinics and laboratories than in schools. The cross-sectional approach is a more common type of genetic research in education whereby the stages of development reached by different age-groups of children are studied and compared simultaneously. The longitudinal approach, however, has certain values which are lost in the cross-sectional approach inspite of the advanced sampling procedures available for use. The former simplifies the statistical problems immensely and often results in some unique discoveries.

SUMMARY

1. Four complex methods involving new purposes and patterns of treatment in educational research are the causal-comparative, the correlation, the case-study and the genetic.
2. The causal-comparative method aims at determining the causes of some educational phenomena through comparing factors associated with the occurrence and non-occurrence of the particular phenomenon under study. This method differs from the historical, the normative-survey and the experimental respectively because it deals with the present phenomena, seeks to determine causal relationships, and, operates in normal field conditions. It may work with a double group of subjects, or a single one only. Its main limitation is that it ignores causes or effects occurring in moderate degrees, and studies only absolute causes and effects.
3. The correlation method, employing the correlation technique, is a distinct research approach which establishes relationship between many variables and educational results simultaneously. Among the various uses of this method are :

   (*i*) measuring the degree of relationship between events ;

   (*ii*) predicting scholastic success ;

(*iii*) predicting teaching success;
(*iv*) predicting school population ; and
(*v*) helping in fundamental research:

The interpretation of coefficients of correlation calculated through analysis of data is a crucial step and needs all care, caution and understanding.

4. The case-study, through investigating into the present as well as the past history of 'cases' under study, establishes causal relationships among phenomena. It studies individual 'cases', abnormal behaviour of children as well as the behaviour of normal groups or individuals.

   The several stages it passes through are :

   (*i*) survey and measurement of the present status of the phenomena under study ;
   (*ii*) formulating a hypothesis as to the probable causes of the phenomena ;
   (*iii*) verifying the hypothesis ;
   (*iv*) validating the diagnosis further through introducing certain changes in the field ; and
   (*v*) followinp-up the case.

   A good case-study is based on complete, valid and continuous data as well as on confidential recording and scientific synthesis.

5. The genetic method of research aims at studying changes, growth and development occurring among individuals and groups, or institutions, over a considerably long period of time, in biological as well as psychological aspects. This method may take the longitudinal or the cross-sectional form. In the educational field, the cross-sectional approach is more common than the longitudinal one which is applied with great success in laboratories and clinics.

QUESTIONS AND PROBLEMS

1. How would you justify the grouping together of such different methods as *the causal-comparative, the correlation, the case-study* and the *genetic*?
2. Consider an important educational problem for solution through the causal-comparative method and plan an outline for research on it.
3. Select reports of two educational investigations—one employing correlation merely as *a technique of analysis* and the other employing correla-

tion as *a method of approach* and explain how the correlation method does not denote merely a statistical device of measuring relationships.

4. The case-study and the genetic methods are different. Still the two forms of the genetic method, longitudinal and cross-sectional, are described as *an extended case-study* and *a series of parallel case-studies* respectively. How would you justify?

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CHAPTER TWELVE

THE RESEARCH REPORT

Research Report—the last indispensable step. Its uses. Some major considerations. General structure: the Preliminary Section (title page, acknowledgement page, preface, lists of contents, tables and figures); the Main Body (introduction, the problem, survey of related literature, the procedure including collection, analysis and interpretation of data, the conclusion); the Reference Section (footnotes, bibliography, appendix, index). Medium of the Report: the Language Medium (avoidance of common errors in structure, idiom and spelling; use of abbreviations, excerpts and numbers; style); the Illustrative Material (tables and figures—their characteristics and forms). Typing of the Report: General rules; Rules for particular features (title page, acknowledgement page, table of contents, list of tables, list of figures, different chapters, subheads, side-heads and paragraph side-heads, quotations, footnotes, tables, figures, bibliography, appendix and index). Some practical hints regarding correct typing.

The last important step in any research study is that of preparing the research report. Report-writing has been recognized as an indispensable part of any scientific piece of research as it records the purpose, the importance, the limitations, the procedure, the findings and conclusions of the study in such a way that it may benefit

(*i*) the investigator himself in clarifying and systematizing his work;

(*ii*) the other researchers who may be guided by the particular investigation in their work of a similar nature;

(*iii*) the students and educators who could make use of the findings of the investigation.

Some major considerations

A research worker at the stage of writing a report of his work has to consider the following questions:

1. What should the general structure of his report be?
2. What form should the development, evaluation and organization of his ideas take?
3. What language medium should he use for his report?

4. What other media can he use for reinforcing his verbal report?
5. How to get it typed correctly?

General Structure of the Report

The general structure of a report consists of three main divisions:

A. the preliminary section including the title page, the acknowledgement page, the table of contents and lists of tables and figures (if any).
B. the main body, including the introduction, the definition of the problem, the description of a survey of related literature, the details of procedure, the findings and conclusions, etc.
C. the reference section including footnotes, the bibliography the appendix and the index (if any).

The first step towards preparing a report should be the preparation of *an outline* of its major divisions and their subdivisions in the form of headings and subheadings of proposed chapters, sections, or paragraphs, dealing with the statement of the problem, related studies, sources and techniques of collecting data, findings, conclusions and suggestions, etc. This outline would guide the researcher in arranging the material at his disposal in an orderly manner as it sets down the pattern of the report.

The Preliminary Section

Title Page

The title of the typed research report usually bears the investigator's name, a statement as to the course for which the study has been required, the date of submitting it, and the name of the institution making that requirement. In reports of studies not undertaken for any course, the investigator's name, the institution he belongs to and the date of completion of the work is indicated. In a published thesis the latter information is substituted or supplemented by the name of the publishers and the date and place of publication.

Acknowledgement Page

Of little real value to the reader, the acknowledgement page is largely one of courtesy in which the investigator acknowledges

the guidance and assistance he has received in the development of the study. Acknowledgement may not refer to the guide so much as to others who may have aided in a special way. It is rightly said that good taste calls for acknowledgements to be expressed simply and tactfully.

Preface or Foreword

Sometimes a preface or foreword, one or two pages long, follows the acknowledgement page, bearing some initial remarks and perhaps a brief statement of the scope, aim and general character of the research.

Table of Contents

A well-developed table of contents renders a good deal of assistance to a reader in choosing rapidly and judiciously what he should, subsequently, read carefully. It is usually desirable to include in it not only the chapter headings, but also the headings of the major subdivisions of the chapters. Sometimes the topics within the subdivisions are also included and are found enlightening by the readers.

Lists of Tables and Figures

Another device used to supplement the table of contents for throwing more light on the subject of the thesis is that of giving lists of tables and figures which occur in the report.

The Main Body

Introduction

The first part of the main body of the report, *the Introduction*, usually includes a statement of the factors leading up to the choice of the problem, the purposes of the study, the value and significance attached to the problem by the investigator as a contribution to education and any other information to express the sincerity of the investigator in his selection.

The Problem

A statement and elucidation of the problem sometimes forms a part of the Introduction ; but more often it is set up as a separate unit. If this is stated in a clear-cut and logical manner, the reader is able to get a sufficiently clear insight into the study from the very beginning. The problem should be defined in detail. The exact area the investigation is

supposed to cover must be well demarcated. The sources of information selected and their nature and delimitations should be mentioned and justified. All terms of a technical nature or those which may seem vague to the lay reader need to be defined carefully.

Survey of Related Literature

Any research worker has to be up-to-date in his information about studies, related to his own problem, already made by others. References are made to such similar or related studies and their evaluation too is made for the benefit of the reader either in the Introductory chapter, or in the chapter on the Problem, or else in a separate chapter. Herein the author finds another opportunity to justify his own endeavour and to emphasize the worthwhile elements in the treatment, selected by him, of the problem.

The Procedure

To explain the developmental process used for the study the investigator has to describe the techniques and tools he has used for collecting, organizing, analysing and interpreting his data. The sources of data tapped, the channels prepared or adapted and utilized, the nature of data collected, their validity and reliability—all these should be given in a clear and adequate manner. Data collected but rejected and the methods tried but not pursued—these should also find their place in the report and should not be just left out of the picture. Unusual or complex techniques of collection, organization, analysis and interpretation should be explained in full. Whether the original data themselves should be included in the text or given in the appendix depends on the nature of the data. If they are not too extensive and are necessary to clarify the discussion they should certainly find a place in the text proper, or in the footnotes. If they are extensive and cumbersome, they should be placed in the appendix.

Of the various aids used to make the presentation of data more effective, tables and figures are most common. When statistical data are assembled according to certain common factors in the form of tables, significant relationships show up clearly. Depending on the type of material at one's disposal,

many kinds of figures are found useful, *e.g.* statistical diagrams, photographs and maps, etc.

All the information described above is sometimes confined to one chapter with separate subdivisions arranged stage-wise. Otherwise, separate chapters are devoted to the collection, the analysis, and the interpretation of data. The arrangement depends on the quantity of information one has to convey to the reader regarding the different stages in the process of the development of the study.

Conclusion

The final unit of the report usually contains the findings of the study, the conclusions the investigator has arrived at, and the generalizations he has formulated on the basis of the study. In stating the conclusions, the investigator must indicate what his contribution has been to his field of study. He should indicate on what data his various conclusions are based. He should clearly demarcate between the inevitable conclusions and his own interpretation of certain data. The range of applicability of the conclusions should be indicated on the basis of the limitations of the sources, the sample, the tools of collection and analysis, etc. Negative as well as positive results should find a place in the conclusions.

Any recommendations, as to the application of the findings, the investigator wishes to make, can find a place in this chapter. Recommendations or suggestions for further study in the field touched by the present research are also found useful and are usually included in the concluding chatper.

The Reference Section

Footnotes

Although spread throughout the main body of the report, footnotes really are part of the reference section due to the function they perform. Never a part of the text proper, the footnotes serve a number of purposes, the main two being :

1. To acknowledge the source of a quotation, paraphrase or idea borrowed by the author.
2. To present explanatory statements, quotations or supplementary material which, though important, may interfere with the flow of the textual material if included in the main body.

Bibliography

A well-organized bibliography, including all references to related materials, forms an important part of a research report. The bibliography furnishes a clue to the quality of the report and helps those interested in developing the problem further, or in studying another angle of the problem.

Usually the references in the bibliography are arranged alphabetically by the author. Sometimes an arrangement by topic, by geographical location, or by some other plan is preferred. In long bibliographies, references are quite often divided into Books, Periodicals, Reports and Bulletins, etc. Annotated bibliographies giving a clear idea of the nature of the reference and the topics it covers adds greatly to the usefulness of the bibliography.

Appendix

A supplemental device used to aid in conveying the full picture of the study, the appendix includes any letters, questionnaires, tests or other tools used in collecting the data. Often tables are placed in the appendix as they help those wishing to analyze the study more closely. One must be careful in presenting material in the appendix for it must appear in exactly the same form as the one in which it has been used in the study.

Index

Although an index is a useful addition to any worthwhile writing, yet typed reports seldom contain an index due to practical limitations of the temporary form of presentation of the material and due to lack of time. In published theses an index should contain not only the topics arranged alphabetically, but also subtopics, topics of any consequence, and a cross-index of these topics and names of authors.

Medium of the Report

Research reports make use of two kinds of media—*verbal* and *illustrative—i.e.* language and illustration.

The Language Medium

Effective report-writing is not an easy task. Even skilful and experienced investigators have to draft their report very carefully and then revise it many times before the final manuscript is ready.

It is customary in India to write reports of research in almost any subject, in the English language. Many of our investigators are at a handicap in English as the medium of expression. They need to take more pains, than is usual with them, in writing their reports and be more careful in avoiding the common errors found so often in the reports of our investigators. A good dictionary, a handbook of style and Roget's *Theasurus* are helpful references for correct grammatical construction and appropriate usage of words and expressions, and should be used in cases of least doubt. Competent friends or relatives should be approached to proof-read the report for correct usage before typing is started. The ordinary rules of correct usage should prevail in all cases.

Frequent errors of spellings found in research reports are extremely disconcerting. Some words, commonly misspelt in reports, every investigator should be careful about, are listed below.[1]

accommodate
affect
all right
allusion
analysis
analyze
consensus
dependent
dependant
develop
development
disappear
disappoint
embarrass
exaggerate
harass
incompatible
indispensable
inescapable
maintenance
oneself
per cent
percentage
personal
personnel
separate
stationary
stationery
supersede
therefore
weird.

It is advisable to avoid not only errors in English spellings but also to avoid American spellings as far as possible. Spellings of non-English words should be kept uniform.

[1] *Manual of Research and Reports* by the Committee on Research of the Amos Tuck School of Administration and Finance, Dartmouth College; U.S.A., McGraw Hill Book Co., Inc., 1937. p. 80.

Regarding the use of numbers in the text of the report one must remember to always spell out the numbers beginning a sentence ; to write fractions and round numbers less than one hundred in words except when they are combined (*e.g.* 20 percent), unless they begin a sentence (*i.e.* Twenty percent) ; to point off thousands or millions by commas in numbers with more than four digits (*e.g.* 1528 ; 15,280).

It is also essential to follow the rules and conventions in the use of abbreviations, capital letters and quotation marks.

The use of abbreviations should be avoided in the text of the report. Even in the footnotes, the bibliography and the tables, only a few abbreviations are considered appropriate.

Common Abbreviations

anon.	anonymous
bk., bks.	book, books
cf.	'compare'
col., cols.	column, columns
ed., eds.	editor, editors ; edition, editions
e.g.	'for example'
et. al.	'and others'
f., ff.	and the following, (pages, lines etc.)
ibid.	'in the same place'
i.e.	that is
intro.	introduction
l., ll.	line, lines
loc. cit.	'in the place or passage cited'
n.d.	no date of publication
op. cit.	'in the work cited'
p., pp.	page, pages
pl., pls.	plate, plates
pref.	preface
trans.	translator, translated, translation
vol., vols.	volume, volumes

The rules for correct capitalization should be followed meticulously. Capitals should not be used in words just for emphasis but only when they add to clarity and are warranted by the rules of rhetoric. In general, the modern practice is to economize on capitals. The use of abbreviations also is subject

to the same rules of capitalization as would apply to words when fully spelled out.

The proper use of quotations or excerpts needs consideration. Direct quotations are often used by report-writers to support their own arguments, to lend prestige of outside authority and colour of a variety of expression. But using such excerpts in excess, in their number or length, may be considered a limitation rather than a merit of the report. It is advisable to include excerpts which are most significant, relevant and short.

On the whole, a good research report is marked by clarity, ease, simplicity, dignity, accuracy and objectivity of expression. Jargon, obtrusive constructions, pomposity or pure abstractions should be avoided at all cost. Proper choice of words and a simple straightforward style should be aimed at. For the sake of objectivity the personal pronouns like *I, me, my, our* and *us* should not be used. The terms 'the investigator' or 'the researcher' should be used instead. In describing procedures already completed it is proper to use the past tense. The passive voice constructions are preferable to active in describing steps of procedure. For example, 'the words frequently misspelled were selected from the compositions of students' is preferable to 'I selected the frequently misspelled words from the compositions of students'.

Special efforts are necessary for our investigators to get in the stride of good report writing. Carelessness at this stage is as grave a limitation as inability to write correctly or effectively.

Medium of Illustrating

There are many illustrative devices of presenting the data in a more effective manner than a mere verbal presentation. Maps, charts, diagrams, graphs and tables are useful illustrative devices, but should be used judiciously. An investigator should choose the forms of presentation

(*a*) to make things as concrete as possible,
(*b*) which are pleasant rather than clumsy, and
(*c*) which allow the use of colour and variety of form for differentiation or accentuation of facts.

This form of evidence is to be placed

(*a*) at the relevant page in the text of the thesis if it needs

immediate reference and is not too long ;

(*b*) at the end as Appendix if the material is not referred to in the body of the text but has bearing on the study ;

(*c*) in a special cover or packet accompanying the dissertation if the material includes illustrations, many in number and irregular in size.

Tables and Figures

A table is a systematic way of placing statistical data in columns and rows according to some classification of the subject matter. Figure is a term applied to a wide variety of graphs, charts, maps, sketches, diagrams and drawings. A figure presents statistical or other data in graphic form. The terms tables and figures, thus, include all types of illustrative media used in research reports by which the reader comprehends and interprets masses of data rapidly and grasps significant details and relationships at a glance.

Marks of Good Tables

1. Good tables are relatively simple, treating of a limited number of ideas.
2. They convey ideas and relationships independently of the text of the report.
3. They are properly placed in relation to the written text material.
4. They should, normally, not exceed the size of the page of the manuscript. Larger tables are always cumbersome. They should be reduced to the manuscript page size by photo status or some other device. Tables larger than half page are placed in the middle of a separate page, while others go well with the text.
5. The main title of a table is brief, and clearly indicates the nature of the data presented. Occasionally a subtitle may supplement the main title to denote additional data like the sources of information and measuring units employed. Such expressions as 'table showing', 'distribution of', or 'frequency of' are unnecessary and should be avoided.
6. They follow the common rules of typing tables properly.

Marks of Good Figures

1. Figures should be simple rather than elaborate or compli-

cated and should convey the exact idea without the aid of textual material.

2. The titles of figures should clearly describe the nature of the data presented and should be placed below the figure.
3. They should follow the related textual discussion, and should be accompanied by appropriate tables to represent the numerical data they are based on if the data are not included in the figure itself.
4. They are numbered with Arabic rather than Roman numericals and follow all the other rules of typography.
5. They present data carefully and accurately without oversimplifying, misrepresenting or distorting them.
6. They are used sparingly as too many figures do not illuminate the presentation so much as detract from it.

Types of Figures

Some types of figures frequently used are

1. *The line graph*—used in the form of (*a*) the frequency polygon or (*b*) the ogive,

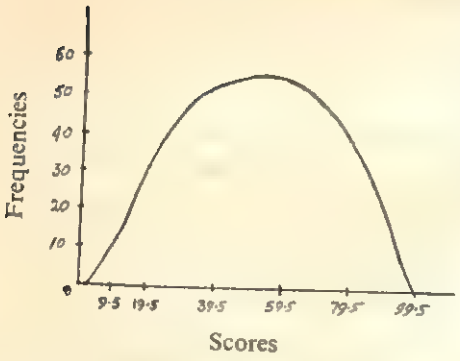

Fig. 3(a). The Frequency Polygon

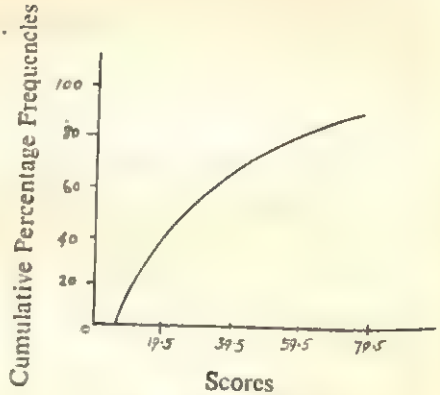

Fig. 3(b) The Ogive

2. *The bar graph* is used in (*a*) horizontal, (*b*) vertical, or (*c*) divided form—representing data by bars of equal width, drawn to scale-length with numerical data lettered within the bar or outside it.
3. *The circle, pie or sector chart* shows that division of a unit into its component parts. It is commonly used to show simple percentage distribution of any factor by first drawing

Fig. 4(a) Horizonal bar graph *Fig. 4(b)* Vertical bar graph *Fig. 4(c)* Divided bar graph

the radius vertically and then arranging the components proportionately in a clockwise direction in descending order of magnitude. The data represented by various segments are usually placed within the respective segments, or else marked by an arrow from outside the segment. Sometimes if various segments are distinguished by the use of colour or pattern, a key is provided just below the figure.

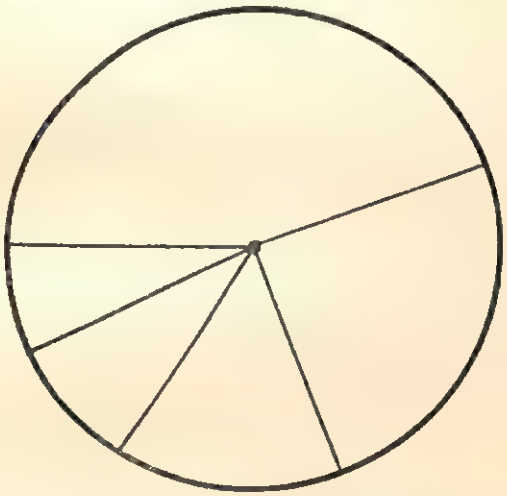

Fig. 5. The circle, pie or sector chart.

4. Maps are used for geographic location or for identification purposes. Dots, circles, or other symbols like shading, cross-hatching or colouring are used for identification within a map. A key is used for guidance.

Typing of the Report

Practically all reported research appears in type-written form. Even though sometimes printed later, it is essential to consider what makes the typing of a report as accurate as possible. An accurately typed report adds substantially to the appearance, the clarity and the meaning of the report. We shall first consider some general rules for typing research reports and then see how particular sections of a report are to be typed.

General Rules for Typing Research Reports

(*i*) All copies of the report must be clean, distinct and legible.

(*ii*) Strike-overs should not be made. All erors should be corrected by erasing neatly on all copies.

(*iii*) Material should be typed on one side of the paper only, leaving $1\frac{1}{2}''$ margins on the top and left-hand side of the paper and $1''$ margins on the right-hand side and at the bottom.

(*iv*) Headings to be typed in the centre should be typed one-fourth of an inch to the right of the centre of the page to allow for binding.

(*v*) All textual material should be double-spaced, with triple spacing between paragraphs, unless otherwise indicated in the rules used (*e.g.* long lists of material may be single-spaced). Even when some material is single-spaced, a double space between different paragraphs or items should be allowed.

(*vi*) Throughout the manuscript an indention of seven spaces should be used at the beginning of paragraphs, quotations and footnotes.

(*vii*) Ditto marks should not be used.

(*viii*) While the pages of the main body of the report are marked in Arabic numerals on the upper right hand corner, the pages of the preliminary section are marked in small Roman letters. The title page, though not numbered, is counted as page 'i', and the next few pages, upto the beginning of the first part or chapter, are numbered consecutively from 'ii' onwards in the centre, one inch from the bottom of the page. The page beginning Chapter I is page 1, but has no number

typed on it. So also the initial page of a section, chapter, bibliography or appendix has no page number typed on it, though a serial number is always allowed for it. The bibliography, appendix and index etc. are numbered serially following the last chapter.

Rules for Typing Particular Features in a Report

Title Page

(*i*) Allowing one-half inch for binding, all material for the title page should be centred.

(*ii*) The title should be typed in capital letters, beginning six double spaces from the top of the page, in an inverted-pyramid style, and double spaced.

(*iii*) The word "BY" should be typed in capitals, centred, 15 double spaces from the top of the page, with the investigator's full name centred one double space below it.

(*iv*) Twenty-nine double spaces from the top of the page should be typed the statement concerning the nature of the study (a term report, dissertation or thesis) and the date of submission, etc. in small letters, single-spaced and set up in inverted pyramid style. The name of the guide or supervisor may also find a place on the title page.

Acknowledgement Page

The heading "ACKNOWLEDGEMENT" should be centred, and three spaces below it should begin the first line of type. If the acknowledgment is very short, all margins could be made wider than normally. The investigator's initials are placed three spaces below the line of the acknowledgment, to the right of the centre of the page.

Table of Contents

Numbered with small Roman page numbers, the table of contents starts with the heading "TABLE OF CONTENTS" typed in capital letters at the top of the page, in the centre. The column headings—"Chapter" and "Page"—have only the initial letters in capital form and are typed two double spaces below the main heading. If the table runs into more than one page,

only the column headings are repeated on the top of every page, not the main heading.

In case the thesis is divided into more than one section or major division the heading for each of them is centred and typed in capital letters, two double spaces below the last line of the preceding division, followed by three spaces before the first line of its own division.

Chapter numbers, without repeating the word "Chapter" are listed in the column headed "Chapter" beginning with the first chapter listed three spaces below the column heading "Chapter", aligned with the periods directly below the letter 'r' in the word "Chapter".

Chapter headings are typed in capital letters. If more than one line is required by a chapter heading, the carry-over is single-spaced and begins just below the first letter of the heading. Different chapter headings are double-spaced.

The headings of main sections within chapters are typed in small letters. Only the first letters of important words (nouns, pronouns, verbs, adverbs and adjectives, the first and last words) are capitalized. Beginning a double space below the first letter of the chapter heading, the subheadings are single-spaced both within and between headings.

The page numbers, indicating the beginning of chapters or divisions, are typed in the column headed "Page". Leaders (. . . .) are used from the last word of the heading to the page numbers.

The bibliography and appendix are included in the table of contents, beginning one double space below the first letter of the chapter titles.

List of Tables

Following the table of contents, beginning on a new page, this list bears the heading "LIST OF TABLES" in capitals, in the centre of the page. "Table" and "Page"—the column headings—are typed, with only the initial letters capitalized, two spaces below the main heading. Table numbers are listed in the column headed "Table" (aligned with the periods directly below the letter 'e') and the corresponding pages are typed in the column headed "Page". Leaders are used from the last word of the heading to the column of page numbers.

Table headings are typed in capital letters and if they run over more than one line the carry-over begins just below the first letter of the heading, and is single-spaced. Between one heading and the next there is double space.

In case the list of tables occupies more than one page, the main heading is not repeated on the second and subsequent pages. Only the column headings are typed on the first line of the page and the list continues in its normal form.

List of Figures

For the main heading and the column headings this list beginning on a new page after the list of tables, follows the same rules as those followed in the list of tables. But whereas the table headings are entirely in capitals, the figure headings are typed in small letters, except for the first letter and any other letters which are normally capitalized in any ordinary sentence.

All figures—*i.e.* diagrams, charts, maps, photographs or pictograms—are included in this list. For the headings, which run over into more than one line, and the lists, which cover more than one page, the rules for typing to be observed are the same as those for the List of Tables described above.

Different Chapters

Various chapters forming the text of the report are typed in proper serial order, each chapter beginning on a new page, bearing the word "CHAPTER" in capitals, and its serial number in Roman numerals (I, II, III, IV. . . .), placed four spaces lower than the usual top line of the text. The chapter designation is followed by the title of the chapter, typed a double space below it, in capital letters, A title requiring more than one line is single-spaced and is set up in inverted pyramid style.

The text begins a triple space below the last line of the title, unless a subdivision heading follows immediately after the chapter heading and is typed only two spaces below the chapter heading.

Sub-heads, Side-heads and Paragraph Side-heads

Any major sub-heads within each chapter should neither

be numbered, nor lettered, nor underscored either. They are centred and typed in capital letters. Placed two double spaces below the last line of the preceding matter, it is followed by a triple space between itself and the first line of the following material. One should avoid placing a subhead near the bottom of the page unless it is followed by at least two lines of textual material.

Other subdivisions of a major subdivision or part of the discussion under the centred head are introduced by side heads, flush with the left margin. For further subdivisions of the content, paragraph side-heads are introduced. They form part of the first line of the paragraph to which they belong. They are not to be numbered or lettered but underscored. They observe the regular paragraph indention and are followed by a period, a dash, and then the content of the paragraph.

Quotations

Almost every researcher includes certain quotations in the body of his report. Such borrowed material may be long or short. Short quotations (occupying about three lines of the text), enclosed within double quotation marks, easily form a part of the usual text. They are double-spaced and if beginning in the middle of a sentence, do not start with a capital letter. Long quotations however, are usually treated differently. In a contrasting form to indicate their borrowed origin, they are typed in single space and indented about ¾ inch from the left margin following the regular paragraph form. They are not enclosed in quotation marks but are separated from the previous and the following text by double spaces in between the text and the quotation.

Direct quotations as well as indirect ones (paraphrase or borrowed ideas), should be accompanied by full documentary information about their source in the form of footnotes. Reference to a footnote is made in the text by a superscript figure, put at the end of the introductory statement, preferably after the author's name is given, always following the punctuation mark.

Any insertions of words or punctuation in quoted material made by the person quoting must be enclosed within brackets.

Any omission of sentences or words should be indicated by ellipsis marks (. . .). If a complete paragraph or more is omitted, it should be indicated by a leader the full width of the quoted material.

Footnotes

Footnotes, whether in the form of reference to sources quoted or in the form of supplementary information, are always placed at the bottom of the page, even if the context does not fill the page. They are separated from the text by a horizontal line extending the whole width of the regular-sized typed page, placed a single space below the last line of the full-typed page. The footnotes observe the regular paragraph indentions and are single-spaced. The first footnote begins a double space below the line separating the footnotes from the text, and double spaces are allowed between footnotes.

Although various modes are adopted for indicating the correspondence between the context and the footnotes, (*e.g.*, by special signs or numbers, beginning from "1" on every page, or running consecutively throughout the report) the best plan seems to be the one by which footnotes are numbered consecutively throughout each chapter, the first footnote of each chapter being numbered "1". The footnote numbers are placed immediately preceding their respective notes, slightly above the line on which the footnote begins, and are not followed by a period.

Footnotes which acknowledge the socurce of a particular piece of material included in the text provide the following information in the order given below:

(*i*) The author's name (first name first), followed by a comma.

(*ii*) The title of the book (under scored), followed by a full-stop.

(*iii*) Place of publication followed by a colon and the name of the publisher and date of publication.

(*iv*) The page number on which the reference is found. It is preceded by "p." if only one page is indicated, and "pp." if it refers to more than one page. The page number is followed by a full-stop.

If the same book is referred to more than once in footnotes the reference is not repeated in its full form. The abbreviations "*op. cit.*," "*ibid*" and "*loc. cit*" are variously used to indicate the source. If a book which has been referred to once in the footnote is acknowledged again after the occurrence of other references in between, the footnote includes the name of the author followed by a comma, and the abbreviation "*op. cit.*" (under-scored) followed by a comma, and the page number. If a book referred to once is referred again and no other reference occurs in between, the footnote includes the name of the author followed by a comma, the abbreviation "*ibid.*" (under-scored) followed by a comma and the page number. If more than one book by the same author has been quoted in the thesis, the name of the particular book the reference belongs to is also given in all the cases. If two or more consecutive references belong to the same page of the same book, in the second (and any subsequent) footnote, the abbreviation "*loc. cit.*" (under-scored) is used instead of "*ibid.*" and the page number is not repeated.

Tables

Tables in a research report may occupy less than a page, a whole page, or even more than a page. Tables large enough to occupy more than half a page are better placed on separate pages by themselves, while shorter tables are placed on the pages where the related textual material appears, following it as closely as possible. As a rule, tables should not exceed the page size of the manuscript. Large tables are better reduced to the manuscript size by photostating or some other device. Tables too wide for the page may be turned sidewise with the top facing the binding of the volume,

Every table bears at its top the word "TABLE" in capital letters, followed by its serial number in capital Roman numerals (I, II, III . . .). In the entire report, tables are numbered consecutively. Two spaces below the word "TABLE" should be typed its caption or title arranged in inverted pyramid style, without any terminal punctuation.

The top of the table is typed three spaces below the last line of the title. Column headings and box heads are clearly labelled. They describe the nature and units of measure of

the data presented. Often abbreviations for terms like number, percentage and frequency etc. are used in typing column headings or box-heads. In case a table is continued in more than one page, the column heading should be repeated at the top of each page, as well as the word "TABLE" which is centred and followed by the word "continued" in parenthesis. The caption is not repeated.

Data in a table is usually single-spaced. Horizontal lines are used only at the top, in the end, and for demarcating the box and column headings, and the data on different items and the totals. To separate the table from the title, double horizontal lines are placed at the top of the table. Vertical lines are often used to separate columns, but are always omitted at the left and the right margin.

In presenting numerical data in a table, decimal points should always be aligned in the column. In case there is no data available for a particular cell, the fact should be indicated by a dash rather than a zero.

For explaining certain items in a table, footnotes are usually used. Small Arabic letters or typewriter key symbols are used as superscripts for the purpose. Use of numerical superscripts should be avoided. Table footnotes are typed immediately a double space below the table, and are single spaced. They extend only the width of the table and follow the same rules of typing as other footnotes.

Figures

Various types of illustrative devices used in a report are all labelled as figures and numbered consequtively throughout the report. Figures may be large or small. Those occupying more than half a page should be better placed on a separate page while those occupying less than half-page, along the textual material. Figures should always follow, not precede, the related discussion in the text.

Unlike the tables, figures are numbered with Arabic rather than Roman numerals. The word Figure, its number, as well as its caption, are placed below rather than above a figure. The word "Figure" or "Fig." is typed at the left-hand side of the page below the figure and is followed by its number and a full-stop. The title or caption follows,

capitalized and punctuated in the same way as an ordinary sentence. But it is single-spaced and has no full-stop at the end. Four different forms of arranging the caption if longer than one line, found in use are:

(*i*) Paragraph form (like footnotes),
(*ii*) Underhung form (like bibliography items),
(*iii*) Block form (carry-over aligned with the first word), and
(*iv*) Inverted pyramid form (like chapter headings).

Any of these forms may be used, and should be followed consistently throughout the report.

Sources from which the data for the figure are secured may be indicated below the title and are usually enclosed in parentheses.

Bibliography

The bibliography, typed at the end of the main body of the report, lists in alphabetical order the references used by the investigator in preparing the report. Usually the bibliography is preceded by a separate page bearing the word "BIBLIOGRAPHY", just above the centre of the page. The first page of the bibliography has the word "BIBLIOGRAPHY" as a centred heading. Each reference begins at the left hand margin of the page, but its carry-over is indented seven spaces. Material for each reference is single-spaced. There is double space between references.

Arranged alphabetically, each book reference in a bibliography is set up in the following order:

(*i*) Name of the author—surname first, followed by a comma and the inititials or the full first and middle names, followed by a comma,

or

Names of the authors—the name of the first author (surname first), followed by the full name of the subsequent author or authors, first and middle names before the surname, with commas in between the different authors' names, followed by a comma at the end.

(*ii*) Title of the book (underscored), followed by a full-stop.

(*iii*) Place of publication, followed by a colon.

(*iv*) Name of Publisher, followed by a comma.
(*v*) Date of publication, followed by a full-stop.
(*vi*) Number of pages in the book (. . . pp.), followed by a full-stop.

Similarly, arranged alphabetically by author's surname each periodical reference is set up as below:

Name of the author or authors, "title of the article," name of the periodical (underscored) vol. . . ., No. . . ., date—.

It may be observed that the presentation of footnotes as well as bibliographical entries differs slightly in form—mainly in punctuation—from author to author. The attempt, however, is always at presenting sufficient information in a *systematic* and *consistent* manner to enable a reader to identify and locate the reference readily and exactly.

Annotated bibliographies are a further help to the readers. If annotated, the annotation should begin a double space below the last line of the reference data and should be single-spaced.

References to encyclopaedias, documents, legal publications, newspapers and manuscripts, etc. follow special usages slightly different from those observed for books and periodicals. Variations in practice are often observed in these references also. Consistency throughout the report is more essential than anything else.

Appendix

Following the bibliography, the appendix is introduced by the word "APPENDIX", typed just above the centre of a separate page, in capital letters.

Appendix may appear in different divisions or in one part only. If divided into parts, each part should be given a letter (A, B, C . . .), and each part should bear, at its top, its designation (*e.g.*, APPENDIX A), set up like chapter headings. If division headings are not required, the first page of the appendix should start with the general heading "APPENDIX".

Index

Introduced by the word "INDEX" on a separate sheet, and bearing the title "INDEX" on the top of the first page, the index items are always listed in an alphabetical order by their

key words. The index is single-spaced, with principal items beginning flush with the left hand margin, the carry-overs indented three spaces, and sub-items indented two spaces. Only the initial letter and such letters as would be capitalized in an ordinary sentence are capitalized in index items.

Usually index is set up in two columns. The numbers of pages where the items are found follow a comma after the item itself, and have commas in between page numbers.

Some practical hints for the researcher regarding correct typing

1. However efficient a typist the researcher may employ for typing his report, the final responsibility for form of the typed manuscript is still the author's. He should, therefore, familiarize himself thoroughly with the rules for correct typing of reports.
2. The author should present his report to the typist in a neat and accurate form which the typist can just copy down for him according to the rules of typing.
3. The author should not only proof-read the typed manuscript when the whole of it is typed. He should read and check very carefully the first few pages of the material as soon as they are typed so as to discover and prevent any lapses in the form of typing.
4. When the report is typed, the investigator should himself study very carefully and check up (against original sources as far as possible) all computations, punctuation, spelling, quotations, footnotes, bibliography and pagination, etc. to see that everything is accurately done.
5. He should cautiously supervise, and check up, the typing of his report from the beginning and proof-read it very carefully before finally submitting it.
6. It is advisable to get the typed manuscript finally seen through by an efficient and trusted friend before submitting it for evaluation or general circulation.

SUMMARY

1. The final step in any research study is the preparation of a systematic report for the investigator's own benefit as well as for the benefit of others.

2. The author of a research report must consider and decide in advance the general structure, the form, the language and illustrative media, and the rules of typography he will adopt for the purpose.
3. He should organise his report in three sections :
   (*a*) *The preliminary section* : the title page, the acknowledgement page, preface and the lists of contents, tables and figures.
   (*b*) *The main body* : the introduction, the definition of the problem, the survey of related information, the details of procedure, the findings and conclusions, etc. arranged in chapters.
   (*c*) *The reference section* : footnotes, bibliography, appendix and index.
4. For preparing his report in the English language, a research worker, whose mother-tongue is not English has to be extra-careful with regard to English spelling, structure, idiom and style. The verbal presentation should be reinforced by a judicious use of illustrative media in the form of appropriate tables and figures (graphs, charts, photos, diagrams, maps and sketches, etc.) wherever necessary.
5. For correct typing of the report the author must very carefully study the general rules of typing research reports as well as the rules of typing particular features of a report (i.e., title page, acknowledgment page, preface, lists of contents, tables, figures, different chapters, sub-heads, side-heads, quotations, footnotes, bibliography and appendix, etc.).

QUESTIONS AND PROBLEMS

1. "While research reports may differ considerably in scope of treatment, they are expected to follow a similar pattern of style and form that has become conventional in academic circles." (John W. Best) Elaborate upon this statement with special reference to the writing of a research report.
2. "The preparation of a scientific report is different in one fundamental respect from an argumentative essay or a literary effort : the self-conscious presentation of negative and positive evidence, along with the technique by which that evidence was obtained." (W.J. Goode and P. K. Hatt). Do you agree? Discuss the implications of this statement.
3. What important considerations would you bear in mind while preparing the report of a research study you have undertaken? Why?

APPENDIX A

A Sample of the Definition of a Research Problem

Title

A Survey of the Academic and Social Adjustment of the Government of India Merit Scholars in Public Schools.

Statement of the Problem

1. The study seeks to find out facts and figures about the following four categories of Merit Scholars :

(*a*) Those who have completed their course of study in the Public Schools.

(*b*) Those whose scholarship was terminated before the completion of their term of scholarship.

(*c*) Those who were withdrawn by their guardians before the completion of their term of scholarship.

(*d*) Those who are at present studying in Public Schools under the Government of India Merit Scholarship scheme.

2. With respect to each of the above the study seeks to answer the following questions :

(*a*) Do they benefit by their studies in these schools ?

(*i*) Has their acedemic progress been satisfactory ?

(*ii*) Have they maintained the standard they had achieved at the schools where they studied before securing these scholarships ?

(*b*) Have they developed well-adjusted personalities ?

(*i*) Are they well-adjusted to school and the children in the school ?

(*ii*) Has their stay at these schools disabled them to fit in their families ?

(*c*) Is there any discrimination in the school facilities and treatment between these scholars and those whose parents hold high status and pay the fees ?

3. The study seeks to summarise the following :

(*i*) The conditions of the award of scholarship.

(*ii*) Selection procedure.

(*iii*) Number of scholarships being given during the period and the amouut of money spent on them.

(*iv*) Socio-economic background of the families of the scholars.

Delimitation of the Problem

A survey of the academic progress is being made of all the scholarship holders from 1953 to 1958. For a survey of social adjustment only scholars in certain selected Public Schools will be taken.

Significance of the Problem

The Government of India has been awarding merit scholarships to some students for education at Public Schools for the last seven years. Some of these scholars who have successfully passed out of the schools are now studying in colleges or universities. But the schoolarship to some of these scholars was withdrawn before they had completed their term, mainly because they did not make satisfactory progress at school. On the other hand, some of the parents withdrew their wards, because they did not find the schools very satisfactory. It is also reported that many of these merit scholars tended to develop in such a way that either they failed to adjust themselves to their own families or to the atmosphere of the public schools where a vast majority of the children come from rich families.

As the Government is spending a large amount of money in the form of these scholarships with a view to enable brilliant, promising and deserving boys and girls to get an opportunity for good education and thus for the full development of their potentialities, it is worthwhile to ascertain whether the merit scholars are adequately benefitting by their studies in these schools or not. Hence the present investigation.

Procedure and Tools

Collection of information and data will be undertaken in relation to :

(*i*) conditions of the award of scholarship; number of scholarships awarded; amount of money spent; number and names of scholars in different schools :

(*ii*) procedure adopted for selecting the scholars ;

(*iii*) socio-economic backgrounds of the scholars :

(*iv*) The academic progress of the pupils—from their progress reports, cumulative records, etc. available from the Ministry of Education and/or the respective schools; also, comparison with their academic attainments before coming to the schools.

(*v*) Their participation in the co-curricular activities, hobbies, games, sports, etc.; the offices they held in various clubs, societies, teams, etc.

(*vi*) Their behaviour, activities and engagements during the vacations; their behaviour immediately after return from long vacations at home, specially for pupils who come from the lower middle class or even poorer classes.

(*vii*) The existence or non-existence of any distinction in school facilities and treatment between these scholars and those whose parents hold high socio-economic status and pay the fees.

Tools

(*i*) Questionnaires to parents of
- (*a*) the pupils who were withdrawn by the parents ;
- (*b*) the pupils whose scholarships were terminated before time;
- (*c*) the pupils who have passed out of the school;
- (*d*) the pupils who are at present in the schools.

(*ii*) Questionnaire to the scholars.

(*iii*) Questionnaire to the headmasters.

(*iv*) Questionnaire to the housemasters.

(*v*) Interview with
- (*a*) the pupils,
- (*b*) the headmasters,
- (*c*) the housemasters and other teachers,
- (*d*) some parents,
- (*e*) personnel of the Ministry of Education directly connected with the Scheme.

(*vi*) Observation of the present pupils in and out of class.

Assistance and facilities required

(*i*) An assistant to collect and tabulate necessary data for the study of about 500 children (5 hours for each child—2500 hours). (Average 34 hours a week's work) about 74 full working weeks—2 academic sessions.

(*ii*) Typist—for forwarding letters; questionnaire forms, Typing data etc.; 400 hours of work—67 working days.

(*iii*) Facilities of despatch.

(*iv*) Preparation of questionnaires—12 proforma, 30 stencils—Rs. 15.50 nP.

About 10,000 sheets of cyclostyling paper 20 reams—Rs. 150/-.

Typing paper and other stationery—Rs. 50/-.

(*v*) Postage—Rs. 200/-

(*vi*) Visits to schools (from Delhi):—

	Miles	*Approximate Travelling Expenses*	*Approximate Stay Expenses*
1. Birla Public School, Pilani	184+Road	36/-	18/-
2. Birla Vidya Mandir, Nainital	321+Road	62/-	30/-
3. The Daly College, Indore	691	113/-	30/-
4. The Doon School, Dehradun	211	38/-	12/-
5. Hyderabad Public School, Begumpet	1676	254/-	30/-
6. Lawrence School, Lovedale	2830	428/-	42/-
7. Lawrence School, Sanawar	402	69/-	42/-
8. M.G.D. Girls Public School, Jaipur	166	31/-	30/-
9. Mayo College, Ajmer	250	44/-	42/-
10. The Modern School, New Delhi	6	30-/	
11. The Rajkumar College, Raipur	943	150/-	24/-
12. The Rajkumar College, Rajkot	693	123/-	24/-
13. The Sadul Public School, Bikaner	463	79/-	24/-
14. The Scindia School, Gwalior	315	55/-	36/-
15. Shri Shivaji Preparatory Military School, Poona-5		176/-	24/-
16. Vikas Vidyalaya, Ranchi	1124	175/-	24/-
17. Yadavindra Public School, Patiala	252	45/-	18/-
Total	...	1908/-	450/-

As it appears that visit to some of these schools may be avoided and that visits to some schools in the same region may be combined into one trip the estimated expenses on this head may be restricted to something like Rs. 2000/- only.

(*vii*) Printing of Report—Rs. 400/-

Total estimated expenditure besides the salary of the assistant (Rs. 200/- p.m. for two years—Rs. 4800/-) and the typist and the despatcher—2415.50 nP.

Time Schedule

(*i*) Collection of preliminary data—6 months.

(*ii*) Visits to schools—1 year.

(*iii*) Tabulation and treatment of data, writing of report etc. —6 months.

Total time—2 years.

APPENDIX B

Samples of Various Inquiry Forms used in Educational Research

1. Questionnaire

*A Questionnaire on the teaching of English in Senior Basic Schools for the Heads of Senior Basic Schools, Delhi**

Note : Please enter the information required in the following questions and oblige.

1. Name and address of the school.....
2. Number of Pupils enrolled in different classes :

Classes	Boys	Girls	Total
VI			
VII			
VIII			

3. Are the classes divided into sections? If 'yes', how many ? Yes/No

   VI.....

   VII.....

   VIII.....

4. To which of the classes is English being taught this

*P.V. Mehrotra, *Teaching of English in Basic Schools—Construction of A comprehensive scheme of work for Teaching English to the Senior Grades of Basic Schools in Delhi Administrative Area*, Ph. D. study under way, Delhi University.

year ?.....

5. When was English introduced in the school ? Year.....
6. Why was English introduced ? (Check (√) one or more of the appropriate reasons below.)
   (*i*) Because the Directorate demanded it.
   (*ii*) Because the school staff demanded it.
   (*iii*) Because the children demanded it.
   (*iv*) Because the parents demanded it.
7. Who teaches English to the various classes, and how many periods a week ? Fill in below :

Class	Name of the Teacher	Qualifications of the teacher	No. of periods per week	Length per period
VI				
VII				
VIII				

8. What English Text Books are taught to different classes ? Fill in below :

Class	Name and part of Text Book	Name of the Author	Name of the Publishers
VI			
VII			
VIII			

9. Besides the Text Books, what other materials (like pictures, charts, flash cards or gramophone records) do your teachers use in teaching English ?

10. Is English teaching correlated with other activities of the school ? If 'yes', with what activities are different types of English work correlated frequently or some times ? Fill in below :

Type of Work	Activities with which frequently correlated	Activities with which sometimes correlated
Oral work		
Written work		
Reading		

11. What particular method of teaching English do English teachers, especially the 6th class teacher, use in your school ? Check (√) below :

(*i*) Translation Method
(*ii*) Direct Method
(*iii*) Structural approach

12. Has your English teacher for the 6th class attended any seminar, workshop or course of instruction in the teaching of English within the last five years ?

Yes/No

13. If 'yes', please give particulars about it.

Name of the Teacher	Name of the seminar or course	Date of the Seminar or course	Place where held	Organised by

14. Which of the following skills do your English teachers try to develop, mainly, among the children in the 6th class ? Check the appropriate skill (√)

    (*i*) speaking
    (*ii*) listening
    (*iii*) reading
    (*iv*) writing

15. How is the children's achievement in language assessed during the year ? (e.g. through class work, home work, tests or examinations etc.)

Aspects of English	Ways of Assessing	How often ? (Weekly, monthly, terminally or yearly)
Speaking		
Reading		
Writing		

16. Do your English teachers find some grave difficulties in teaching the subject effectively ? Yes/No
    If 'yes', mention briefly the main difficulties.
17. Would your English teacher/teachers like to get their difficulties solved through assistance or guidance from outside ? Yes/No
18. Would it be possible for the school to allow an experiment with a comprehensive scheme of teaching English effectively to the 6th class children ? Yes/No
19. If 'yes', check the facilities that the school can give :
    (*i*) Permitting the investigator to test the children from time to time.
    (*ii*) Allowing necessary time to English teachers for receiving guidance in the matter.
    (*iii*) allowing the English classes to be supervised occasionally.

(*iv*) Readjusting the periods allotted for English, if necessary.

(*v*) Procuring some necessary material-aids.

(*vi*) Any other (mention briefly).

20. Kindly attach a copy of the current Time-Table of the 6th, 7th and 8th classes in your school.

HEADMASTER'S SIGNATURE

Date.....

2. PROBLEM CHECKLIST

*What are the Children Worried About ?**

1. Age..... 2. Date of Birth.....
3. Boy or Girl..... 4. Class..... 5. Date.....
6. Name of School.....
7. Name or Identification.....

DIRECTIONS

This is not a test. It is a list of problems which are often troubling students of your age—problems of health, money social and cultural life, home relations, vocational, school work and the like. Some of these problems are likely to be troubling you—to a smaller degree or to a greater degree. What you have to do is as follows :

There are 100 problems. Facing the problems are three columns—column I for 'not at all', column II for 'to some extent', column III for 'very much'. Read through the problems one by one slowly and putting yourself in that situation. See how much you are worried by each of them; i.e. if the problem does not trouble you at all, or it troubles you to some extent or it troubles you very much. Put a check mark (√) in the I column if your reply is "not at all", in II column, if your reply is "to some extent" and in the III column, if your reply is "very much". Thus every problem will have one check mark (√) either in col. I, col. II or col. III.

*M. L. Jain, *An Investigation into What Adolescent Boys and Girls Worry About.* Unpublished M.Ed. dissertation, Delhi University, 1958.

Example :—Suppose the 33rd problem, "I am tired very easily", does not trouble me at all, I will put a check (√) in column I just opposite to it.

Read through the problem and go on putting a check mark against them as indicated above, taking care that no problem is left unmarked.

S. No.	Problems	Not at all	To some extent	V. much
1.	Being nervous.			
2.	Being timid or shy.			
3.	Being sick too often.			
4.	Weak in writing.			
5.	Parents not trusting.			
6.	Living too far from school.			
7.	Being in love.			
8.	Lacking skill in games.			
9.	Being afraid of the future.			
10.	Being afraid of God.			
11.	Being lazy.			
12.	Lacking in leadership.			
13.	Not feeling hungry.			
14.	Slow in reading.			
15.	Family quarrels.			
16.	Having too few nice clothes.			
17.	Catching any sex disease.			
18.	Teachers not being friendly.			
19.	Doubting some of the religious things taught.			
20.	Family opposing the plan of work.			
21.	Feeling inferior.			
22.	Being made fun of.			
23.	Too short or too tall.			
24.	Worrying about examination.			
25.	Sickness in the family.			

S. No.	Problems	Not at all	To some extent	V. much
26.	Needing to find a part-time job.			
27.	Not being attractive to opposite sex.			
28.	School head being too strict.			
29.	Being confused by some religious belief.			
30.	Doubting ability to handle a good job.			
31.	Having bad luck.			
32.	Being criticised by others.			
33.	I am tired very easily.			
34.	Missing too many days of school.			
35.	Being criticised by parents.			
36.	Having no regular pocket money.			
37.	Needing advice about marriage.			
38.	Not getting along with a teacher.			
39.	Doubting the value of worship and prayer.			
40.	Afraid of not being able to go to college.			
41.	Having bad dreams.			
42.	Wanting to be left alone.			
43.	Losing weight gradually.			
44.	Not spending enough time in studying.			
45.	Parents expecting too much.			
46.	Having less money than other friends.			
47.	Finding it hard to control sex urge.			
48.	School not being a congenial place.			
49.	Wondering what becomes of people when they die.			
50.	Doubting the wisdom of the vocational choice.			
51.	Lacking self control.			
52.	Having to meet other people.			
53.	Not getting enough sleep.			
54.	Not having enough time for recreation.			
55.	Lacking self control.			

S. No.	Problems	Not at all	To some extent	V. much
56.	Size, type and locality of the house.			
57.	Loving some one who does not love.			
58.	Text books being too hard to understand.			
59.	Sometimes not being as honest as required or desired.			
60.	Wanting advice on what to do after high school.			
61.	Lacking self confidence.			
62.	Feeling that nobody understands.			
63.	Menstrual or female disorder.			
64.	Being faced with failure in school work.			
65.	Friends not being welcome at home.			
66.	Family having economic hardship.			
67.	Afraid of close contact with the opposite sex.			
68.	Being made to take subjects which are not liked.			
69.	Doubting if a job can be secured in a chosen vocation.			
70.	Being too easily discouraged.			
71.	Not knowing the social etiquette.			
72.	Bothered by a physical defect.			
73.	Being required to speak up in the class-room.			
74.	Parents, separated, divorced or deserted.			
75.	Having no place to entertain friends.			
76.	Being afraid of losing some one loved.			
77.	Getting excited too easily.			
78.	Worrying about impressing people.			
79.	Being overweight or underweight.			
80.	Not knowing how to study effectively.			
81.	Parents favouring a brother or sister.			

S. No.	Problems	Not at all	To some extent	V. much
82.	Working too much outside of school work.			
83.	Being concerned with proper sex behaviour.			
84.	Being afraid to be left alone.			
85.	Not having freedom to explain ideas.			
86.	Having trouble with some sense organ.			
87.	Too much work required in some subjects.			
88.	Not getting along with a sister or a brother.			
89.	Not having certain conveniences at home.			
90.	Not being sure of finding a suitable mate.			
91.	Not afraid of making mistakes.			
92.	Not able to express well in words.			
93.	Not being very attractive physically.			
94.	Not allowed to take some subjects which are liked.			
95.	Family not understanding the school work.			
96.	Being unhappy most of the time.			
97.	Not allowed to go round with people who are liked.			
98.	Finding it hard to talk about own troubles.			
99.	Ever remembering mistakes made in the past.			
100.	Having too little chance of doing what is liked.			

3. Rating Scale*

There are five columns meant to indicate the seriousness or undesirability of these behaviour-problems. Please weigh very carefully each problem (No. 1-55) and express your "own" opinion by putting a circle round the star lying in the column which expresses your judgment.

Example :—Suppose in your opinion the first behaviour-problem, *i.e.* 'absentmindedness' is "of slight but almost negligible consequence." You then put a circle ○ around the star-sign * in column No. II against the first problem (*i.e.* absentmindedness) like ⊙.

"How serious (or undesirable) is this problem in any child?"

S. No.	Behaviour-Problems of Children.	Of no consequence (or importance).	Slight but almost negligible consequence.	Of some consequence.	Makes for considerable difficulty.	An extremely grave and difficult problem.
		I	II	III	IV	V
1.	Absent-mindedness	*	*	*	*	*
2.	Abusive language	*	*	*	*	*
3.	Aggressiveness	*	*	*	*	*
4.	Backwardness in school studies	*	*	*	*	*
5.	Bed-soiling	*	*	*	*	*
6.	Boasting (showing off)	*	*	*	*	*
7.	Conceit (pride)	*	*	*	*	*
8.	Cowardice (timidity)	*	*	*	*	*
9.	Cruelty to animals	*	*	*	*	*
10.	Cruelty to younger children	*	*	*	*	*
11.	Cunningness	*	*	*	*	*
12.	Day-dreaming	*	*	*	*	*
13.	Dependence	*	*	*	*	*

*V. P. Talwar, *An Investigation into Attitudes of Parents Towards Behaviour Problems of Children.* Unpublished M. Ed. dissertation, Delhi University, 1953.

S. No.	Behaviour-Problems of children	I	II	III	IV	V
14.	Depression	*	*	*	*	*
15.	Destructiveness	*	*	*	*	*
16.	Dishonesty (cheating)	*	*	*	*	*
17.	Disobedience	*	*	*	*	*
18.	Ego-centricism (attention getting)	*	*	*	*	*
19.	Enuresis (bed-wetting)	*	*	*	*	*
20.	Extravagant habits	*	*	*	*	*
21.	Fearfulness	*	*	*	*	*
22.	Feeding difficulties	*	*	*	*	*
23.	Forgetfulness	*	*	*	*	*
24.	Gambling	*	*	*	*	*
25.	Gang-membership (undesirable companionship).	*	*	*	*	*
26.	Heterosexual activities	*	*	*	*	*
27.	Homosexual activities	*	*	*	*	*
28.	Irresponsibility	*	*	*	*	*
29.	Jealousy	*	*	*	*	*
30.	Laughing (giggling)	*	*	*	*	*
31.	Laziness	*	*	*	*	*
32.	Lying (untruthfulness)	*	*	*	*	*
33.	Masturbation	*	*	*	*	*
34.	Meddlesomeness	*	*	*	*	*
35.	Nail-biting	*	*	*	*	*
36.	Nervousness	*	*	*	*	*
37.	Procrastination	*	*	*	*	*
38.	Restlessness (lack of concentration).	*	*	*	*	*
39.	Rudeness	*	*	*	*	*
40.	Seclusiveness (unsocialness)	*	*	*	*	*
41.	Shyness (recessive behaviour)	*	*	*	*	*
42.	Smoking	*	*	*	*	*
43.	Stammering (stuttering)	*	*	*	*	*
44.	Stealing	*	*	*	*	*
45.	Stubbornness	*	*	*	*	*
46.	Sullenness	*	*	*	*	*
47.	Talkativeness	*	*	*	*	*

S. No.	Behaviour Problems of children	I	II	III	IV	V
48.	Tardiness (unpunctuality)	*	*	*	*	*
49.	Temper tantrums	*	*	*	*	*
50.	Thumb-sucking	*	*	*	*	*
51.	Truancy (purposeless slipping and wandering)	*	*	*	*	*
52.	Uncleanliness	*	*	*	*	*
53.	Violence	*	*	*	*	*
54.	Whispering in class	*	*	*	*	*
55.	Worrying (anxiety)	*	*	*	*	*

4. Score Card

Government of.....

Textbook Selection Committee.....

1. Name of the book.....
2. Author/Authors.....
   .....
3. Publisher.....
4. Class.....
5. Total number of pages.....
6. No. of pages illustrated .....
7. Date of publication.....
8. Cost.....
9. Name of the Reviewer.....
10. Date.....

*Score Card for Evaluating General Science Text Books**

S. No.	Features	Weight	Evaluation Grade and its score					Total
			Very Good (5)	Good (4)	Average (3)	Below Average (2)	Poor (1)	
	1	2			3			4
1. A.	*Objectives of the Science Curriculum and Content* Does the textbook follow the aims and objectives of the Primary Science Curriculum by laying due emphasis on (*i*) Basic concepts? (*ii*) Desirable attitudes? (*iii*) Essential skills?							
B.	*Syllabus* Does the material given in the book conform to the prescribed syllabus?							
2.	*Organization of the Content and the Method of its Presentation.*							
(*a*)	Do the different subject areas receive equitable attention in relation to one another, in so far as the space allotment in the textbook is concerned?							
(*b*)	Are the forms of presentation satisfactory throughout the book?							

*V. N. Wanchoo, *Criteria and Score-Card for Evaluating General Science Text Books for Primary Schools*. Central Bureau of Text Books Research, Ministry of Education and Scientific Research, Government of India, Delhi.

1	2	(5)	(4)	3 (3)	(2)	(1)	4
(*c*) Does the presentation of the content lead to the development of the scientific method: making observations, keeping their record, enquiring, collecting and considering evidence before arriving at conclusions?							
(*d*) Does the author not *tell* the answer everywhere but lead the child to it through useful activity and independent learning methods?							
(*e*) Is the content organised according to the suitability of seasons?							
(*f*) Is there any correlation with the local crafts and is it natural?							
(*g*) Has the content been presented so as to make the pupils understand the general principles of science?							
(*h*) Has provision been made throughout for individual differences?							
3. *Language*							
(*a*) Does the language take into consideration the need of the grade level?							
(*b*) Is the expression clear, lively, logical, simple and free from inaccuracies and errors ?							
(*c*) Are the vocabulary norms satisfactorily followed?							

1	2	(5) (4) (3) (2) (1)	4
Learning and Teaching Aids			
A. Illustrations			
(*a*) Is the space devoted to illustrations in proportion to the demand of the grade level?			
(*b*) Is the depiction clear, accurate and scientifically true?			
(*c*) Are the illustrations attractive?			
(*d*) Do they occur in all subject areas?			
B. *Exercises*			
Do the exercises serve the needs and interests of the child, help in the development of concepts, attitudes and skills, develop his power of thinking, reasoning and sense of judgment, and train him adequately in independent learning?			
C. Are there other desirable aids also?			
D. *Teacher's Manual*			
Does the book contain copious instructions to the teacher? Are they clear and helful to him?			
5. *Physical Features*			
How satisfactory is the quality of :—			
(*a*) the paper,			
(*b*) cover,			
(*c*) binding,			
(*d*) print (Point size), ink,			
(*e*) leading, and			
(*f*) size of the book			

5. Interest Inventory*

Below is given a long list of various occupations, activities, school subjects and amusements divided into various sections. You are required to note whether you like, dislike or are indifferent to each item. Necessary directions are given before each section. Read the directions carefully and be strictly honest in answering each item. It is necessary that you work rapidly. All the items are to be answered.

Section I—Occupations

From the list of occupations given below, indicate after each whether you would like that kind of work or not. You are not asked whether you would take up that occupation permanently but merely whether or not you would enjoy that kind of work. Against each occupation are three letters, L, I and D. Draw a circle round L if you like that kind of work, a circle round I if you are indifferent to that kind of work, a circle round D if you dislike that kind of work.

1. Actor	L	I	D	16. Lawyer	L	I	D
2. Poet	L	I	D	17. Typist	L	I	D
3. Musician	L	I	D	18. Watch Maker	L	I	D
4. Editor	L	I	D	19. Ship Officer	L	I	D
5. Draftsman	L	I	D	20. School Teacher	L	I	D
6. Carpenter	L	I	D	21. Mechanic	L	I	D
7. Chemist	L	I	D	22. Manufacturer	L	I	D
8. Cartoonist	L	I	D	23. Office Clerk	L	I	D
9. Artist	L	I	D	24. Office Manager	L	I	D
10. Ambassador	L	I	D	25. Politician	L	I	D
11. Air Force Officer	L	I	D	26. Photographer	L	I	D
12. Author of Novels	L	I	D	27. Farmer	L	I	D
13. Administrative Officer	L	I	D	28. Merchant	L	I	D
				29. Jeweller	L	I	D
14. Business Firm Manager	L	I	D	30. Factory worker	L	I	D
				31. Factory Manager	L	I	D
15. Building Contractor	L	I	D	32. College Lecturer	L	I	D

*S. R. Bhat. *A Study into the Vocational Interests of Eleventh Class Boys of Meerut Schools.* Unpublished M. Ed. dissertation, Delhi University, 1957.

33. Judge	L	I	D	65. Dentist	L	I	D
34. Doctor	L	I	D	66. Athletic Director	L	I	D
35. Dairyman	L	I	D	67. Broker	L	I	D
36. Accountant	L	I	D	68. General Designer	L	I	D
37. Grocer	L	I	D	69. Black-smith	L	I	D
38. Railway Official	L	I	D	70. Architect	L	I	D
39. Radio Engineer	L	I	D	71. Army Officer	L	I	D
4o. Stenographer	L	I	D	72. Telephone Operator	L	I	D
41. Statesman	L	I	D	73. Engraver	L	I	D
42. Army Officer	L	I	D	74. Court Reporter	L	I	D
43. Surveyor	L	I	D	75. Pilot	L	I	D
44. Whole-sale dealer	L	I	D	76. Telegraphist	L	I	D
45. Wood-carver	L	I	D	77. Publisher	L	I	D
46. Y.M.C.A. Director	L	I	D	78. General Writer	L	I	D
47. Textile Designer	L	I	D	79. Education Director	L	I	D
48. Salesman	L	I	D	80. Weaving Master	L	I	D
49. Secretary	L	I	D	81. Gur Maker	L	I	D
50. Social Worker	L	I	D	82. Speculator	L	I	D
51. Provisions Merchant	L	I	D	83. Hair Dresser	L	I	D
52. Printer	L	I	D	84. Vegetable Seller	L	I	D
53. Psychologist	L	I	D	85. Bookseller	L	I	D
54. Mechanical Engineer	L	I	D	86. Potter	L	I	D
55. Mining Engineer	L	I	D	87. Mason	L	I	D
56. Civil Engineer	L	I	D	88. Kiln-Owner	L	I	D
57. Inventor	L	I	D	89. Truck or bus owner	L	I	D
58. Hotel Manager	L	I	D	90. Scissors Manufacturer	L	I	D
59. Life Insurance Agent	L	I	D	91. Confectioner	L	I	D
60. Employment Manager	L	I	D	92. Leather worker	L	I	D
61. Electrical Engineer	L	I	D	93. Sculptor	L	I	D
62. Cashier	L	I	D	94. Principal of a College	L	I	D
63. Bank Manager	L	I	D	95. Inspector of Schools	L	I	D
64. Librarian	L	I	D	96. Overseer	L	I	D

Section II—School Subjects

Indicate as in Section I your interest in the following school subjects. Work rapidly and do not skip any item.

97. Indian Languages L I D
98. Languages Foreign L I D
99. Languages Classical L I D
100. Geography L I D
101. Economics L I D
102. Psychology L I D
103. Education L I D
104. Logic L I D
105. Military Science L I D
106. Biology L I D
107. Astronomy L I D
108. Mathematics L I D
109. Commerce L I D
110. Sculpture L I D
111. Painting L I D
112. Drawing L I D
113. History L I D
114. Civics L I D
115. Music L I D
116. Physics L I D
117. Chemistry L I D
118. Woodcraft L I D
119. Bookcraft L I D
120. Tailoring L I D
121. Metal work L I D
122. Spinning and Weaving L I D
123. Leather work L I D
124. Industrial Chemistry L I D
125. Agriculture L I D
126. Physical Training L I D

Section III—Amusements

Indicate in the same manner as in Section I whether you like the following or not. If in doubt, consider your most frequent attitude. Work rapidly. Record your first impression.

127. Riding L I D
128. Boating L I D
129. Swimming L I D
130. Gardening L I D
131. Fishing L I D
132. Taking long walks L I D
133. Solving puzzles L I D
134. Collecting stamps or tickets L I D
135. Excursions L I D
136. Fortune tellers L I D
137. Drilling in a company L I D
138. Poetry L I D
139. Cards L I D
140. Museums L I D
141. Cinemas L I D
142. Zoos L I D
143. Visiting friends L I D

144. Reading newspapers L I D
145. Playing games L I D
146. Smoking L I D
147. Listening to radios L I D
148. Collecting flowers L I D
149. Dancing L I D
150. Bee keeping L I D
151. Visiting places L I D
152. Remaining idle L I D
153. Singing L I D
154. Photography L I D
155. Observing Nature L I D
156. Painting L I D
157. Making toys L I D
158. Gossiping L I D
159. Collecting leaves L I D

Section IV—Activities.

Indicate your interest as in Section I.

160. Repairing electric wiring L I D
161. Repairing a clock L I D
162. Operating machinery L I D
163. Handling horses L I D
164. Giving "First Aid" L I D
165, Raising flowers and vegetables L I D
166. Decorating your room with flowers L I D
167. Argumenting with friends L I D
168. Interviewing prospectus in selling L I D
169. Interviewing men for a job L I D
170. Making a speech L I D
171. Organizing a play L I D
172. Opening conversation with a stranger L I D
173. Teaching children L I D
174. Teaching adults L I D
175. Taking responsibility L I D
176. Meeting and directing people L I D
177. Meeting new situations L I D
178. Drilling soldiers L I D
179. Writing personal letters L I D
180. Entertaining others L I D
181. Bargaining L I D
182. Looking at shop-windows L I D
183. Methodical work L I D
184. Regular hours for work L I D

185. Saving money	L	I	D
186. Contributing to charities	L	I	D
187. Raising money for charity	L	I	D
188. Living in a city	L	I	D
189. To draw plans for public buildings, houses or gardens	L	I	D
190. To keep your books, papers, pencils, etc. in their proper places	L	I	D
191. To follow political events and current topics in newspapers, etc.	L	I	D
192. To sell tickets for a lottery or for your school show	L	I	D
193. To make attractive designs and posters for advertising	L	I	D
194. To know what is inside the surface of the earth	L	I	D
195. To experiment with chemicals combining different materials to see the effect	L	I	D
196. To knit socks, vests, etc. at home	L	I	D
197. To use saw, hammer, nails, etc. to repair articles	L	I	D
198. To write a drama or an essay on the subject of your choice	L	I	D
199. To know how the human mind works	L	I	D
200. To visit sick persons in hospitals			
201. To type out your letters and lesson notes neatly	L	I	D
202. To read the lives of great men of the past and present	L	I	D
203. To keep a systematic account of money spent and received	L	I	D
204. To inquire about the prices of articles in the market	L	I	D
205. To make a radio-set at home	L	I	D
206. To make leather goods like shoes, purses, bags, etc.	L	I	D
207. To make articles of wood like tables, chairs, boxes, etc.	L	I	D
208. To drive a railway engine	L	I	D
209. To take part in debates	L	I	D
210. To make and write stories of your own	L	I	D
211. To protect the life and property of others	L	I	D

212. To see an operation being performed by a surgeon L I D
213. To know how the mind of the criminal works L I D
214. To help others to settle their quarrels L I D
215. To take down the speech of a lecturer word by word L I D
216. To be placed incharge of making arrangements for school sports or concerts L I D
217. To estimate the value of buildings, motor cars, plots of lands, etc. L I D
218. To draw cartoons or humorous sketches of persons or animals L I D
219. To feed, water and take care of cows, bullocks and horses L I D
220. To prepare varnish, paint or polish at home L I D
221. To become an officer on ship L I D
222. To write articles for school paper or a local newspaper L I D
223. To put small parts together as in a clock, radio, lock, sewing machine, etc. L I D
224. To organize a club or society and plan meetings to find some work for everyone L I D
225. To repair motor cars or other machines L I D
226. To know how mental desires or mental troubles are caused
227. To make ropes, laces, etc. or small machines L I D
228. To rewrite sentences until they express just what you want to say L I D
229. To discuss with friends how all persons can live in health and happiness L I D
230. To plan how to work, to manage people, to run a firm successfully L I D
231. To know the details of an atom or hydrogen bomb L I D
232. To know all about coal, iron, and other metals, and their manufacture L I D
233. To know how soap, oil, cream etc., are manufactured L I D
234. To handle money, give change, etc. L I D

235. To do fine engraving, or carving work on wood, metals, etc.	L	I D
236. To go on doing the same thing mechanically for a long time	L	I D
237. To raise chicken, ducks and other fowl and eggs to sell them	L	I D
238. To answer telephone calls, give the information or messages to others	L	I D
239. To know how sound is recorded on gramophone records	L	I D
240. To belong to army, navy or air force when there is no war	L	I D
241. To draw attractive designs for cover pages of books or magazines	L	I D
242. To visit the homes of needy people and help them	L	I D
243. To know how telegraph and wireless messages are conveyed	L	I D
244. To study the air routes of the world	L	I D
245. To look closely at big buildings and appreciate the architecture	L	I D
246. To make models of aeroplanes, ships, motor cars, etc.	L	I D
247. To lead an outdoor life of adventure and physical work	L	I D
248. To know how a film is produced.	L	I D

6. Attitude Scale*

Name..... .....

Age.....Male/Female.....

Religion.....Qualification.....

Profession..... Approximate monthly income.....

Do you attend a Temple, Gurdwara, Mosque, or a Church?—Yes/No.

*K. L. Khattar, *An Investigation into the Attitude of Guardians Towards Religious Instruction in the Higher Secondary Schools of Delhi.* Unpublished M.Ed. dissertation, Delhi University. 1954.

Instructions to Check the Questionnaire

The questionnaire has been prepared on a five point scale. Put a check mark (√) against each statement in the column you think appropriate. For the sake of illustration, let us take the first statement: 'Religious teaching in school makes the child truthful'.

If you think that religious teaching has exactly this effect on the child, put the check mark against it under the column, "strongly agree"; but if you think that the effect is there but not to such an extreme, then put the check mark (√) against it under the column "agree"; if you cannot decide either way you put the check mark (√) against this statement under the column "uncertain", and so on. Please do not leave any statement unmarked.

Statement	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
1. Religious teaching in schools makes children truthful.					
2. Religious teaching in schools makes children dutiful.					
3. Religious teaching in schools makes children hard-working.					
4. Religious teaching in schools makes children superstitious.					
5. If religion is taught in schools, children will lead contented lives when they grow up.					
6. Children become narrow-minded on account of religious teaching in schools.					
7. Religious teaching in school makes children hypocrites.					
8. Religious teaching is a part of education.					
9. Children become communal-minded on account of religious teaching in schools.					

Statement	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
10. Religious teaching in schools develops a feeling of social service in children.					
11. Religious teaching in schools develops a spirit of cooperation in children.					
12. Tenets of a particular religion should not be taught in schools.					
13. Sectarian religious teaching in schools is necessary for making children good citizens.					
14. Religious teaching in schools makes children respect their parents.					
15. Religious teaching in schools makes children respect their teachers.					
16. Children become tolerant when they are taught religion in schools.					
17. Children become eccentric on account of religious teaching in schools.					
18. Only the main principles common to all religions should be taught in schools.					
19. Children should not be made to perform rituals in schools.					
20. Religion should be taught as a separate subject in schools.					
21. On account of religious teaching in schools children learn to respect the rights of others.					
22. Religious teaching in schools helps in making children good citizens.					
23. Religious teaching in schools is a step to international understanding.					
24. Religious teaching in schools makes children fanatics.					
25. Religious teaching in schools damps the originality of children.					

Statement	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
26. Religious teaching in schools leads to the spiritual development of children.					
27. Children develop power of concentration on account of religious teaching in school.					
28. Children become fatalist when they are taught religion in schools.					
29. Religious teaching in schools helps to make children self-disciplined.					
30. Children learn to value time on account of religious teaching in schools.					
31. Religious teaching is the concern of the parents, not of the teachers.					
32. Religious teaching should be optional in schools.					
33. Religious teaching in schools does not interest children.					
34. There is no place for religious teaching in schools in secular India.					
35. Religious teaching in schools must be well planned to produce good effect on children.					
36. Comparative study of different religions should be encouraged in schools.					
37. Religious and moral teaching is one and the same thing.					
38. On account of religious teaching in schools children learn to face difficulties with a happy heart.					
39. Children become indifferent to worldly affairs as a result of religious teaching in schools.					
40. Religious teaching should be imparted in a general assembly rather than in individual classes.					

Statement	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
41. Education in morals should be given without reference to any religion in schools.					
42. Religious teaching in schools will lead to the solution of many troubles of the world.					
43. Schools must impart religious teaching to make children understand the Indian culture					
44. Children become sympathetic as a result of religious teaching in schools.					
45. Religious teaching in schools makes children fearless.					
46. Children become conservative on account of religious teaching in schools.					
47. Children become self-reliant when they are taught religion in schools.					
48. Children's minds are filled with unnecessary fears through religious teaching in schools.					
49. Religious teaching should be compulsory for all children in schools.					
50. Religious teaching in schools leads to communal harmony.					
51. Religious teaching in schools is not at all necessary for sound education.					
52. Religious teaching in schools can help stop growing indiscipline among students.					
53. Children become inquisitive on account of religious teaching in schools.					
54. Children become discriminating as a result of religious teaching in schools.					
55. Religious teaching in schools makes children support all social and economic injustice.					

APPENDIX C

A Sample of Items in Different Psychological Tests

1. Achievement Tests

True-False Items

1. If a triangle is equilateral, it is also equangular. T/F
2. In a siphon, the difference of the water pressures in the two arms causes the water to flow. T/F
3. In a right-angled triangle, the hypotenuse is shorter than any median. T/F
4. Permanent teeth may be diseased even before they appear in the mouth. T/F
5. Adjectives qualify nouns only. T/F
6. Cash is debited for all cash received. T/F
7. The Reserve Bank of India is a private shareholders' Bank. T/F
8. India exports over 90% of her annual produce of mica. T/F
9. There is no difference between a bill and law. T/F
10. India is a permanent member of the United Nations. T/F
11. Australia is in the northern hemisphere. T/F
12. Civilisations of the Aryans of the Vedic Age and Epic Age differed much. T/F

Completion Items

1. A straight line drawn across a set of given lines is called.....
2. Weight of a body is equal to its mass multiplied by.....
3. If $x+3=7$, then $x=$..... .....
4. By the application of dry heat, starch is converted into.....
5. The p-li-e-an ran after the thief.
6. Obedience. He does not.....my words.
7. In India, good quality of salt is obtained from.....
8. The highest judicial body in India is.....
9. The President of Indian Union holds his post for..... years.

10. Tasmania is parted from Australia by.....strait.
11. The oldest of all the vedas is.....
12. In the War of American Independence, ...was the general of American armies.

Multiple Choice Items

1. The stability of a body is increased by
   ( ) *a.* lowering its C. G.
   ( ) *b.* raising its C. G.
   ( ) *c.* decreasing its weight.
   ( ) *d.* decreasing the base support.
2. If $(a+b)=5$ and $ab=6$, then a^2+b^2 is equal to.....(.....)
   (a) 25 *(b)* 19 *(c)* 13 *(d)* 20.
3. In Ferril Oxide (FO_2 O_3), the valency of iron is
   ——*(a)* two
   ——*(b)* three
   ——*(c)* four
   ——*(d)* five.
4. The person who writes a Promisory Note is known as the
   (*a*) Payee (*b*) Maker (*c*) Endorsee (*d*) Endorser
   (*e*) Drawer.
5. Among the coal-producing countries of the world, India ranks:
   (*a*) Third (*b*) Seventh (*c*) Tenth (*d*) Fourth.
6. Singapore is an important port, because: ( )
   (*a*) It is a natural harbour.
   (*b*) It is in the hands of the Britishers.
   (*c*) It is located between the Indian Ocean and the Pacific Ocean on an important trade route.
   (*d*) Foreigners have settled there.
7. Blood from vein is
   ( ) *a.* Dark red.
   ( ) *b.* Issues from the side of the wound further from the heart.
   ( ) *c.* Spurts out in jets.
   ( ) *d.* Issues from the side of the wound nearer to the heart.
   ( ) *e.* Flows in a steady continuous stream.
8. A person who tries again and again is strong, persevering, healthy, energetic. ( )

9. He loved me (more, much, many) than anything (other, another, else) in the world.
10. Sovereignity is one of the most essential elements of (1) The President, (2) Prime Minister, (3) State, (4) Governor, (5) Home Minister.
11. A buffer state is ( ) 1. A small neutral state between two greater states to prevent direct clashes between them.
    2. A small state which is subject to a bigger state.
    3. A state having republic government.
    4. A big state lying between two small states.
12. During the reign of Harsh Vardhan, India was visited by :
    1. Chanakya
    2. Fahian
    3. Hieun Tsang.
    4. Megasthanes.

Matching Items

1.

A	B
a. ( ) The side opposite to the right-angle of a right-angled triangle	1. Altitude
b. ( ) A line which forms a 90 Degree angle with another line.	2. Bisector
c. ( ) A line from vertex to the middle point of the opposite side of a triangle.	3. Chord
d. ( ) A line that divides an angle into two equal parts.	4. Diameter
e. ( ) A line which joins opposite angular points of a quadrilateral.	5. Diagonal
	6. Hypotenuse
	7. Locus
	8. Median
	9. Perpendicular

2.

A	B
( ) *a.* The outer layer of skin is	1. Thyroid

( ) *b.* The coloured part of eye is
( ) *c.* The ductless gland, which lies in the front of neck is
( ) *d.* The nerve, which carries messages to the brain is

2. Auditory
3. Optic
4. Epidermis
5. Cementani
6. Choroid
7. Solera.

3.

A	B
( ) *a.* Dishearten	1. Anecdote
( ) *b.* Courteously	2. Death-rate
( ) *c.* Hatred	3. Discharge
( ) *d.* Story	4. Discourage
( ) *e.* Mortality	5. Ill-will
( ) *f.* Emphatic	6. Strong
	7. Inattentive
	8. Politely

4.

Names	Events
a. Kanishka	1. The siege of Arcot
b. Chandra Gupta Vikramaditya	2. Revival of Sanskrit literature
c. Alauddin Khilji	3. Construction of the Jomuna Canal
d. Firoz Shah	4. The split of Budhists into two sects
e. Dalhousie	5. Plunder of Devgiri
f. Wellesley	6. The doctrine of lapse
	7. Final defeat of Tipu
	8. Invasion of Timur

Some other types of items

1. Underline the word or phrase which means most nearly the same as the word in *italics*.
   He came and begged his master to *forgive* him.
   reward, discharge, punish, pardon, obey.
2. Underline the one that does not belong to the group :
   Arabia, Iraq, Mangolia, Deccan
3. Below are given four events. Read these carefully and then give the order in which the events took place. You

are required to write your answer in the bracket given on the right side.

A. The Battle of Panipat.
B. Timur's invasion of Northern India.
C. Ghazani's invasion of Northern India. (D C B A)
D. The battle between Alexander and Raja Porus on the banks of the river Jhelum.

2. Personality Inventories

1. Do you usually seek suggestions from others? Yes No ?
2. Is your health better or poorer than the average for your age? Yes No ?
3. Do you get discouraged easily? Yes No ?
4. Would you feel very self-conscious if you had to volunteer an idea to start a discussion among a group of people? Yes No ?
5. Do you day-dream frequently? Yes No ?
6. I think most people would lie to get ahead. True False Cannot Say.
7. A windstorm terrifies me. True False Cannot Say.
8. My hardest battles are with myself. True False Cannot Say.
9. Peter is a big, strong boy who can beat any of the other boys in a fight. Am I just like him? Yes No ?
10. To write stories. Like Indifferent Dislike.
11. Having people take me for older than I am. " " "
12. Pertending to be the hero or heroine in a movie. " " "
13. Helping to get meals ready at home. " " "
14. Dancing or singing or telling stories to amuse a group. " " "
15. Which alternative is most, and which least, irritating :—
People who (*a*) Laugh at you
(*b*) Are sarcastic to you,
(*c*) Gossip about you.

16. (*a*) I wish I didn't have so many aches and pains.
    (*b*) I wish I wouldn't keep changing my mind.
17. Would you prefer to hear a series of popular lectures on
    (*a*) the progress and needs of social service work in the cities of your part of the country or (*b*) contemporary painters?

3. Interest Inventories

1. Do you like to operate an adding machine better than (two other activities) ?
2.

	Like least	Like most
(*a*) Develop new varities of flowers.		
(*b*) Conduct advertising compaign for florists.		
(*c*) Take telephone orders in a florist shop.		

3. *Groups of Activities to Check from*
   (*i*) Creative-Scientific
   (*ii*) Technical
   (*iii*) Production manager
   (*iv*) Uplift
   (*v*) Musician
   (*vi*) Certified Public Accountant
   (*vii*) Business Detail
   (*viii*) Business contact
   (*ix*) Sub-professional technical
   (*x*) Verbal
   (*xi*) President of manufacturing concern

4. Attitude Scales

Thurstone Method : (Scale for measuring attitude towards communism).

1. Communism is the solution to our economic problems.
2. Give Russia another twenty years or so and you'll see that communism can be made to work.
3. Workers can hardly be blamed for advocating communism.
4. Both the evils and benefits of communism are greatly exaggerated.

5. I am not sure that communism solves the problems of capital and labour.
6. If a man has the vision and the ability to acquire property, ought to be allowed to enjoy it himself.
7. Police are justified in shooting down communists.

Likert's Technique

1. To study morale-optimistic or pessimistic outlook during depression of the 1930's

Strongly Agree	Agree	Un-decided	Dis agree	Strongly Dis-agree	
SA	A	U	D	SD	It is difficult to think clearly these days.
SA	A	U	D	SD	It is difficult to say the right thing at the right time.
SA	A	U	D	SD	A man should be willing to sacrifice everything for his family.
SA	A	U	D	SD	A person should obey only those laws which seem reasonable.
SA	A	U	D	SD	Legislatures are too ready to pass laws to curb business freedom.
SA	A	U	D	SD	A man can learn more by working four years than by going to high school.

2. The Scale of Belief of the Progressive Education Association

A	U	D	We should buy foreign products only when American goods are not available.
A	U	D	In these days of economic interdependence, it is desirable that we buy goods from other nations.

APPENDIX D

A List of Problems Studied during 1950-60, in Various Fields of Education in India*

S. No.	Topic	Sub-mitted in	Studied at	Studied for
(1)	(2)	(3)	(4)	(5)
Field—Psychology of Education				
1.	Personality patterns of Juvenile delinquents with special reference to U.P.	—	B.H.U.	Ph.D.
2.	Art as a projective technique for deviant children.	1959	V.B., U.	M.Ed.
3.	Use of Rorschach as a tool for investigating personality differences between the superior and backward students in art.	1959	W.T.C., A.	M.Ed.
4.	A comparative study of the personality pattern of adolescents (16+) belonging to the scheduled and non-scheduled castes in the city of Agra.	1960	W.T.C., A.	M.Ed.

*In this list B.H.U. stands for Banaras Hindu University, Banaras.
V.B., U. stands for Vidya Bhawan, Udaipur,
W.T.C., A. stands for Women's Training College, Agra.
P.S.M., J. for Prantiya Shikshan Mahavidyalaya, Jabalpur.
C.I.E., D. for Central Institute of Education, Delhi.
M.T.C., M.U. for Mexton Training College, Madras University.
R.T.C., C. for Radhanath Training College, Cuttack.
E.D., A.U. for Education Department, Allahabad University.
C.E., O.U. for College of Education, Osmania University.
U.K., T. for University of Kerala, Trivandrum.

(1)	(2)	(3)	(4)	(5)
5.	Personality differences between High School students of Model School and Kalani Keta.	1950	P.S.M., J.	M.Ed.
6.	A Survey of intelligence and emotional and personality traits of young delinquents in the Reformatory schools.	1951	P.S.M., J.	M.A.
7.	A study of personality of secondary school teachers by means of the ranking scale method.	1954	P.S.M., J.	M.A.
8.	A study of personality problems of college students in relation to guidance provided by the college.	1954	P.S.M., J.	M.A.
9.	An investigation into the development of certain personality traits among Public School children in India.	1956	C.I.E., D.	M.Ed.
10.	A study of perceptual maturation process.	1958	V.B., U.	M.Ed.
11.	A study of recall in children.	1957	M.T.C., M.U.	M.Ed.
12.	An investigation of the relationship between fertility of imagination and school achievement of pupils in some middle school class.	1959	M.T.C., M.U.	M.Ed.
13.	The psychological needs of adolescent girls and their bearing on individual adjustment.	1956	C.I.E., D.	Ph.D.
14.	A study of discipline in Secondary schools from the psychological point of view.	—	R.T.C., C.	M.Ed.

(1)	(2)	(3)	(4)	(5)
15.	Personal adjustment of the degree class students.	1959	V.B., U.	M.Ed.
16.	A psychological study of withdrawing teens and teachers' attitudes.	1956	E.D., A.U.	M.Ed.
17.	Pattern of teacher-pupil relationship.	1959	V.B., U.	M.Ed.
18.	An experimental study of the effect of cooperative and competitive motives upon the work efficiency of school children.	1949	P.S.M., J.	M.A.
19.	A sociometric study of the relationship between children's choices of each other and their teachers' estimates of popularity.	1956	M.T.C., M.U.	M.Ed.
20.	An investigation into the relationship between attitude and achievement of VIII class children.	1957	P.S.M., J.	M.A.
21.	A study of the attitudes of High School students towards religion.	1957	M.T.C., M.U.	M.Ed.
22.	Change of attitudes among children in Basic schools	1957	V.B., U.	M.Ed.
23.	Secondary-school pupils' attitude towards English.	1959	V.B., U.	M.Ed.
24.	Background and attitudes of teachers to their profession.	1950	P.S.M., J.	M.Ed.
25.	The attitude of students to some of their study subjects.	1950	P.S.M., J.	M.Ed.
26.	A comparative study of the attitude of adolescent girls towards teachers.	1958	E.D., A.U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
27.	Intelligence test performance in relation to a span of attention and span of memory	1960	M.T.C., M.U.	M.Ed.
28.	The relation of performance in Intelligence Tests to neuroticism and extroversion—introversion indices of some High School puplis	1960	M.T.C., M.U.	M.Ed.
29.	A diagnostic study of the difficulties encountered by the pupils of forms IV and V in solving problems in General Mathematics.	1959	M.T.C., M.U.	M.Ed.
30.	A diagnostic study of common errors of Sixth Form pupils in learning Algebraic Fractions	1959	M.T.C., M.U.	M.Ed.
31.	The difficulties of High School pupils in learning Simple and Compound Interest.	1959	M.T.C., M.U.	M.Ed.
32.	Causes of failure of students in English at the High School Certificate Examination, Orissa.	1959	R.T.C., C.	M.Ed.
33.	Analysis of causes of mistakes in the performance of secondary school students in Science.	1955	C.E., O.U.	M.Ed.
34.	A study of student failures at the High School stage.	1955	V.B., U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
35.	Backwardness in reading ability in English	1959	V.B., U.	M.Ed.
36.	Diagnostic testing in Arithmetic for class V.	1954	P.S.M., J.	M.Ed.
37.	Study of the cause of scholastic failure in intelligent children.	1954	P.S.M., J.	M.A.
38.	A Comparative study of general backwardness with specific backwardness in Arithmetic.	1951	P.S.M., J.	M.A.
39.	An investigation into the reading interests of High School students in Udaipur City Schools.	1957	V.B., U.	M Ed.
40.	An investigation into the study habits of High School students.	1956	P S.M., J.	M.Ed.
41.	The activities of Brilliant Children.	1955	V.B., U.	M.Ed.
42.	A study of imagination in High School Children.	1957	M.T.C , M.U.	M.Ed.
43.	A psychological study of Mathematical ability and backwardness in Mathematics in High School pupils.	1952	P.S.M , J.	M.Ed.
44.	An analysis of literary and scientific aptitudes.	1950	P.S.M., J.	M.A.
45.	A study of the abilities of children of groups A, B and C of Higher Secondary Examination Course of Delhi.	1959	C.I.E , D.	M.Ed.
46.	Minor behaviour disorders of children between the ages of 11+ and 13+.	1955	E.D., A.U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
47.	A study of cheating in classroom work in mathematics.	1958	E.D., A.U.	M.Ed.
48.	An investigation into the causes of indiscipline among boys of VIII-X classes belonging Delhi Schools.	1959	C.I.E., D.	M.Ed.
49.	A Psychological study of institutionalized children with a view to understand the actiology of problem-behaviour in some children.	1958	C.I.E., D.	Ph.D.
50.	A study of correlation between concrete and abstract intelligence.	1956	E.D., A.U.	M.Ed.
51.	Maladjustment among adolescents.	1957	V.B., U.	M.Ed.
52.	The problem of recidivism among juvenile delinquents (boys).	1957	M.T.C., M.U.	M.Ed.
53.	An investigation into the reading interests of 6th and 7th grade children.	1959	R.T.C., C.	M.Ed.
54.	An inquiry into the reading interests of pupils at different age levels in some secondary schools of the Mysore State.	1956	M.T.C., M.U.	M.Ed.
55.	A survey of aesthetic interests of students at the High school stage.	1958	C.E., O.U.	M.Ed.
56.	Likes and dislikes of pupils in written Hindi composition for class IX.	1959	V.B., U.	M.Ed.
57.	An investigation into the interest of High School girls in Geography.	1959	W.T.C., A.	M.Ed.

(1)	(2)	(3)	(4)	(5)
58.	A comparative study of interest and efficiency of pupils in School subjects.	1949	P.S.M., J.	M.A.
59.	Interest of High School boys in physical activities.	1958	E D., A U.	M.Ed.
60.	Reading interests of Post-graduate students.	1956	E.D., A.U.	M.Ed.
	Field—Measurement in Education			
61.	Construction of an achievement test in High School Mathematics compulsory for the city of Cuttack.	1958	R.T.C , C.	M.Ed.
62.	Comparison of school progress record with teachers' assessments.	1957	P.S.M., J.	M.Ed.
63.	Construction of an achievement test for the High School pupils.	1958	R.T.C., C.	M.Ed.
64.	Construction of a scientific aptitude test for the High School pupils.	1958	R.T.C., C.	M.Ed.
65.	A study of the methods and results of testing comprehension in English in Form IV.	1959	M.T.C., M.U.	M.Ed.
66.	An analytical study of the test methods followed in General Science in Form VI of some Madras High Schools with reference to their objectives.	1958	M.T.C., M.U.	M.Ed.
67.	Correlation between intelligence and scholastic achievements of boys and girls in Form VI of some schools in Mysore City.	1958	M.T.C., M.U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
68.	Aptitude testing and mechanical aptitude assessment.	1954	C.E., O.U.	M.Ed.
69.	An achievement test in English for class IX.	1960	V.B., U.	M.Ed.
70.	Construction and standardization of achievement tests.	1957	C.E., O.U.	M.Ed.
71.	An essay in construction and standardization of achievement test in General Science.	1959	C.E., O.U.	M.Ed.
72.	An experimental study of the description type and new-type tests as measures of achievement in Natural Science.	—	U.K., T.	M.Ed.
73.	Assessment in Basic Education.	1955	V.B., U.	M.Ed.
74.	Construction of an achievement test in Agriculture for class VIII.	1967	V.B., U.	M.Ed.
75.	Construction of an Attitude Scale for measuring attitude towards Teacher-Training.	1960	W.T.C., A.	M Ed.
76.	Constructing an achievement test in Arithmetic for class VIII and its correlational study with intelligence.	1960	W.T.C., A.	M.Ed.
77.	A correlational analysis of the achievements in scientific and literary subjects in the High School curriculum.	1959	P.S.M., J.	M.Ed.
78.	Construction of a test for measurement of understanding of Fractions, Decimals and Percents in Arithmetic of the pupils of class IX of Delhi City.	1956	C.I.E., D.	M.Ed.
79.	The prognostic value of the higher secondary examination in Delhi.	1957	C.I.E., D.	Ph.D.

(1)	(2)	(3)	(4)	(5)
80.	Construction of a test of understanding of the scientific principles and their applications in daily life for the students of delta class in Delhi Higher Secondary Schools.	1958	C.I.E., D.	M.Ed.
81.	An experimental comparison of two sets of teacher-made tests in Psychology.	1958	C.I E., D.	M.Ed.
82.	Construction of an achievement test in Hindi for the VIII class students of Senior Basic Schools under Delhi Administration.	1958	C.I.E., D.	M.Ed.
83.	Different methods of marking English Composition (a comparison).	1959	C.I.E., D.	M.Ed.
84.	A study of student writing in Delhi Schools.	1960	C.I.E., D.	M.Ed.
85.	Factorial analysis of Junior High School marks.	1956	E.D., A.U.	M.Ed.
86.	Intelligence and success in Examinations (12+ to 14+).	1957	E.D., A.U.	M.Ed.
87.	Predictability of achievement in Higher Secondary School from the tests of general intelligence, arithmetical ability, and scientific aptitude.	1960	R.T.C., C.	M.Ed.
	Field—Educational Administration and Organization			
88.	The administrative problems of the Head Masters of Private High Schools of Agra Division.	1957	C.I.E., D.	M.Ed.

(1)	(2)	(3)	(4)	(5)
89.	A survey of parent-teacher cooperation as it exists in the Higher Secondary Schools of Delhi.	1960	C.I.E., D.	M.Ed.
90.	A comparative study of the teaching loads of subject teachers of Secondary Schools.	1960	C.I.E., D.	M.Ed.
91.	A study of administrative control of primary education, Andhra Pradesh.	1958	E.D., A.U.	M.Ed.
92.	Multiple class teaching (a study of Rural Basic Schools in Allahabad District).	1958	E.D., A.U.	M.Ed.
93.	Education in Second Five Year Plan.	1958	E.D., A.U.	M.Ed.
94.	A study of self-sufficiency in Basic Schools.	1958	E.D., A.U.	M.Ed.
95.	Recreation facilities for girls of 16+ in Allahabad Colleges.	1955	E.D., A.U.	M.Ed.
96.	An investigation into the working of school libraries.	1959	C.I.E., D.	M.Ed.
97.	Self-Government for pupils of Higher Secondary schools.	1957	E.D., A.U.	M.Ed.
98.	A survey of the present state of organizational patterns of student self-government in the Higher Secondary Schools of Delhi.	1957	C.I.E., D.	M.Ed.
99.	Wastage and stagnation in urban and rural schools.	1950	P.S.M., J.	M.Ed.
100.	A survey of private enterprise in Secondary education in the city of Jabalpur.	1957	P.S.M., J.	M.Ed.

(1)	(2)	(3)	(4)	(5)
101.	A study of the systems of grant-in-aid in the field of secondary education.	1957	P.S.M., J.	M.Ed.
102.	An investigation into the problems of organizing co-curricular activities and their integration with curricular activities of High Schools of Madhya Pradesh.	1956	P.S.M., J.	M.Ed.
103.	An investigation into the records of secondary schools in Madhya Pradesh.	1955	P.S.M., J.	M.Ed.
104.	A study of inspection procedure in the Middle Schools of Sirmaur District (H.P.).	1960	W.T.C., A.	M.Ed.
105.	A comparative study of Local Education Administration in U.P. and U.K. with reference to Agra City.	1959	W.T.C., A.	M.Ed.
106.	A comparative study of the administrative set-up of Multi-purpose schools in the state of Madhya Pradesh and Comprehensive schools of U.S.A.	1959	W.T.C., A.	M.Ed.
107.	Supervision of Basic Schools in Bhopal Region (M.P.).	1959	W.T.C., A.	M.Ed.
108.	Trends in the administrative partnership between the Central, State and Local educational authorities in India since 1947.	1959	V.B., U.	M.Ed.
109.	State of control over Higher and Secondary education in India since 1947.	1959	V.B., U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
110.	Problems of conversion of non-Basic schools into Basic Schools in Udaipur.	1957	V.B., U.	M.Ed.
111.	The educational finance in Rajasthan.	1954	V.B., U.	M.Ed.
112.	The educational administration in Rajasthan.	1954	V.B., U.	M.Ed.
113.	An investigation into the present system of organization and administration of physical and health education programme in Secondary schools.	—	U.K., T.	M.Ed.
114.	A study of the organization and methods of supervision and inspection of schools in Kerala.	—	U.K., T.	M.Ed.
115.	A comparative study of multi-purpose and post-basic schemes.	1958	C.E., O.U.	M.Ed.
116.	A study of the administrative and organizational problems in the field of elementary education in Chingleput District.	1958	M.T.C., M.U.	M.Ed.
117.	Construction of a score-card for evaluating the efficiency of a High School Headmaster in school administration.	1960	R.T.C., C.	M.Ed.
118.	Problems of single-teacher primary schools in Orissa.	1958	R.T.C., C.	M.Ed.
	Field—Teacher Education			
119.	Training of teachers as a preparation for their professional duties.	1958	E.D., A.U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
120.	A study of women teacher trainees' attitude towards their profession.	1958	E.D., A.U.	M.Ed.
121.	Training of teachers for the Deaf.	1955	E.D., A.U.	M.Ed.
122.	Pupil-teacher and the problem of class control.	1957	E.D., A.U.	M.Ed.
123.	Training of Primary school teachers in Assam.	1957	E.D., A.U.	M.Ed.
124.	A study into and survey of the adjustment in teachers.	1957	C.I.E., D.	M.Ed.
125.	An investigation into the problems related to the preparation of teachers for teaching English to Secondary School children in India.	1957	C.I.E., D.	M.Ed.
126.	An investigation into the professional preparation of Mathematics teachers for secondary schools in India.	1958	C.I.E., D.	M.Ed.
127.	An exploratory study of the Rorschach variables differenciating between the most and least efficient student teachers.	1958	C.I.E., D.	M.Ed.
128.	An investigation into the validity of a Battery of Selection Tests used for admission to a Bachelor of Education Degree Course.	1958	C.I.E., D.	M.Ed.
129.	An evaluation of the Junior Basic Teachers Training programme in the Punjab.	1959	C.I.E., D.	M.Ed.
130.	A study of the variety of practical work provided for pupil teachers in some selected Teachers' Colleges in India.	1959	C.I.E., D.	M.Ed.

(1)	(2)	(3)	(4)	(5)
131.	An investigation into the pre-service professional preparation of science teachers for secondary schools in India.	1959	C.I.E., D.	M.Ed.
132.	A study of fifty successful teachers—factors influencing their vocation and the degree of ultimate success achieved in it.	1949	P.S.M., J.	M.A.
133.	A survey of the development of teacher-training in Madhya Pradesh.	1957	P.S.M., J.	M.Ed.
134.	A study of the opinions of Principals of Secondary Schools of Agra District on in-service education of teachers.	1960	W.T.C., A.	M.Ed.
135.	Attitude of Trained Graduate Teachers towards the Training Courses in Uttar Pradesh.	1959	W.T.C., A.	M.Ed.
136.	Adjustment of pupil-teachers at Vidya Bhawan Teachers' College.	1957	V.B., U.	M.Ed.
137.	The history and problems of teacher-training in India.	1954	V.B., U.	M.Ed.
138.	Evaluation of In-service Teacher-Training Programmes (a comparative study).	1960	V.B., U.	M.Ed.
139.	A study of some personality traits of graduate teacher-trainees in Madras State.	1957	M.T.C., M.U.	M.Ed.
140.	Preparation of a standard for selection of trainees for B. Ed. class by item-analysis of results of previous tests.	1960	R.T.C., C.	M.Ed.

(1)	(2)	(3)	(4)	(5)
141.	Construction of an attitude scale for the measurement of attitudes of pupil-teachers towards Basic Education.	1959	R.T.C., C.	M.Ed.
142.	A survey of the guidance needs of High School pupils.	1956	P.S.M., J.	M.Ed.
143.	A proposed plan for educational guidance in Multi-purpose schools of Madhya Pradesh.	1960	W.T.C., A.	M.Ed.
144.	Study of expressed, manifest and tested interests of the delta class students.	1959	V.B., U.	M.Ed.
145.	An investigation to explore and evolve tools for educational guidance.	1958	V.B., U.	M.Ed.
146.	Vocational interests of High School boys	1956	V.B., U.	M.Ed.
147.	Guidance needs of student teachers.	1958	V.B., U.	M.Ed.
148.	Occupational survey in Hyderabad city from the point of view of vocational guidance.	1956	C.E., O.U.	M.Ed.
149.	The relation between the desire of School leavers for Engineering occupations and their suitability for them.	1957	M.T.C., M.U.	M.Ed.
150.	The attitude of college girls towards teaching as a career.	1957	C.I.E., D.	M.Ed.
151.	An investigation into the nature, work and requirements of the job of a cotton textile supervisor.	1957	C.I.E., D.	M.Ed.
152.	A study of the vocational interests of VIII class boys of senior basic schools.	1958	C.I.E., D.	M.Ed.

(1)	(2)	(3)	(4)	(5)
153.	A comparison of Strong's Vocational Interest Scores and Kuder Preference Record Scores for the 11th grade students of Delhi Schools.	1959	C.I.E., D.	M.Ed.
154.	An investigation into the relationship between vocational preferences and curriculum choice at the Higher Secondary stage.	1959	C.I.E., D.	M.Ed.
155.	An investigation into socio-economic influences which affect the choice of vocations of the secondary school boys of Delhi.	1960	C.I.E., D.	M.Ed.
156.	A study of correlation between general intelligence and mechanical aptitude.	1956	E.D., A.U.	M.Ed.
157.	General interests and aptitudes for girl's professions in the under-graduate students at Allahabad University.	1957	E.D., A.U.	M.Ed.
158.	An investigation into leisure-time activities of secondary school boys of Delhi State in relation to their vocational preferences.	1960	C.I.E., D.	M.Ed.
	Field—Child Development			
159.	Language development during Nursery years.	1957	E.D., A.U.	M.Ed.
160.	Problems of emotion in childhood.	1955	E.D., A.U.	M.Ed.
161.	A study of children's reactions to frustration with the help of Rosenzeweig picture-frustration study technique.	1950	C.I.E., D.	Ph. D.

(1)	(2)	(3)	(4)	(5)
162.	Play activities in Children (3-6 years).	1955	E.D., A.U.	M.Ed.
163.	A study of the development of imagination in children.	1956	M.T.C., M.U.	M.Ed.
164.	Parental-attitude as a causative factor of maladjustment in children.	1959	V.B., U.	M.Ed.
165.	Social adjustment of the child.	1957	C.E., O.U.	M.Ed.
166.	A study of factors that contribute to the academic success of the brilliant students.	1949	P.S.M., J.	M.A.
167.	A study of age differences in verbal learning.	1958	M.T.C., M.U.	M.Ed.
168.	Health services for children with special reference to Hyderabad city.	1956	C.E., O.U.	M.Ed.
169.	Student's health in Udaipur city.	1955	V.B., U.	M.Ed.
170.	Experimental study of the influence of nursery school training on the personality development in the child.	1951	P.S.M., J.	M.A.
	Field– Curriculum			
171.	Some suggestions for the reorganization of secondary school curriculum.	1950	S.M., J.	M.Ed.
172.	A comparative study of curriculum development at the secondary stage.	1959	V.B., U.	M.Ed.
173.	An investigation into the problem of the contents and scope of a curriculum in Social Studies for secondary schools in Kerala.	1959	U.K., T.	M.Ed.

(1)	(2)	(3)	(4)	(5)
174.	Psychological and sociological bases of curriculum construction.	1959	C.E., O.U.	M.Ed.
175.	Development of curriculum in Mathematics for the 6th and 7th classes of C.I.E. Experimental Basic School.	1958	C.I.E., D.	M. Ed.
176.	An investigation into the curriculum of Hindi at High School level.	1952	P.S.M., J.	M.Ed.
177.	Construction of units in Social Studies for Class IX of Higher Secondary Multipurpose Schools.	1956	P.S.M., J.	M.Ed.
178.	The curriculum of English Class X.	1957	E.D., A.U.	M.Ed.
179.	The place of English poetry in Senior High School stage.	1956	E.D., A.U.	M.Ed.
180.	A critique of the new curriculum for Junior High Schools in U.P.	1956	E.D., A.U.	M.Ed.
181.	Social studies in the curriculum of Schools in the new set-up divertations.	1958	C.E., O.U.	M.Ed.
182.	Comparative study of Mathematics curriculum at the primary stage of different states of Indian Republic.	1954	C.E., O.U.	M.Ed.
183.	The development of the secondary school curriculum in Madras State since 1908.	1960	M.T.C., M.U.	M.Ed.
	Field—Socio-Economic Conditions			
184.	Social acceptance and rejection as affected by the socio-economic status of the girl students of the X Grade.	1960	C.I.E., D.	M.Ed.

(1)	(2)	(3)	(4)	(5)
185.	Relation of socio-economic factors with Intelligence of girls of 13 at Allahabad.	1955	E.D., A.U.	M.Ed.
186.	Socio Economic factors in the education of Harijans.	1956	E.D., A.U.	M.Ed.
187.	A critical study of the social and economic conditions of women primary school teachers and the effect of the same on their professional efficiency.	1957	P.S.M., J.	M.Ed.
188.	Influence of home environment on home-work of school pupils.	1957	P.S.M., J.	M.Ed.
189.	Sociological study of attitudes of women-teachers towards the teaching profession.	1959	W.T.C., A.	M.Ed.
190.	Correlation between socio-economic status and scholastic achievement.	1958	V.B., U.	M.Ed.
191.	Influence of socio-economic factors of environment on the growth of children.	1954	C.E., O.U.	M.Ed.
192.	The socio-economic background of children in Vidya Bhawan and other Indian Public Schools.	1953	V.B., U.	M.Ed.
193.	A study of the environment of some gifted High School pupils with an assessment of its influence on their school career.	1958	M.T.C., M.U.	M.Ed.
	Field—Methods of Teaching			
194.	A critical examination of methods of teaching natural science in some Mysore Secondary schools.	1959	M.T.C., M.U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
195.	Teaching of Mother Tongue through the activity methods.	1959	R.T.C., C.	M.Ed.
196.	An appraisal of the probability of teaching Social Studies through Project Method.	1960	R.T.C., C.	M.Ed.
197.	A study of the practice of 'correlation' in some basic schools.	1959	M.T.C., M.U.	M.Ed.
198.	A comparative study of the methods of teaching Geography at High School Stage.	1958	E.D., A.U.	M.Ed.
199.	Structural approach and the Traditional method of teaching English.	1958	E.D., A.U.	M.Ed.
200.	A comparative study of story-telling method and lecture-method in History.	1957	E.D., A.U.	M.Ed.
201.	Motivating techniques in Arithmetic at Primary stage.	1957	E.D., A.U.	M.Ed.
202.	Relative merits of Basic and non-Basic methods.	1957	V.B., U.	M.Ed.
203.	A critical-comparative study of Basic Education and the Project Method.	1956	E.D., A.U.	M.Ed.
204.	An investigation into the effectiveness of various teaching methods in the teaching of Chemistry.	1955	C.E., O.U.	M.Ed.
	Field—History of Education			
205.	Education in medieval Karnataka.	1956	C.E., O.U.	M.Ed.
206.	Growth of Basic Education in India.	1955	V.B., U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
207.	The Moghul system of Education in India.	1958	C.E., O.U.	M.Ed.
208.	Education in Karnataka during the Vijayanagar period.	1957	C.E., O.U.	M.Ed.
209.	Universities in Buddhist era.	1955	C.E., O.U.	M.Ed.
210.	A study of the development of elementary education in Periya-Kulam Municipality for the past 25 years.	1959	M.T.C., M.U.	M.Ed.
211.	The impact of English educational thought on the Indian educational system between 1835 and 1921.	1960	M.T.C., M.U.	M.Ed.
212.	Education Development in British India (1854-1904).	1959	C.I.E., D.	Ph.D.
213.	Female education in Orissa from 1803-1959.	1960	R.T.C., C.	M.Ed.
214.	Survey of Higher-Secondary Education in Etawah city from 1947-1954.	1955	E.D., A.U.	M.Ed.
215.	The development of Secondary Education in Madhya Bharat (from 1948-1955).	1956	E.D., A.U.	M.Ed.
	Field—Text Books			
216.	Construction of criteria for the writing and selection of Arithmetic Text Books and evaluation of a few Arithmetic Text Books used in the High classes of the secondary schools in the Punjab.	1958	C.I.E., D.	M.Ed.
217.	Formulation of criteria in the light of commonly accepted objectives of Geography teaching for the selection and			

(1)	(2)	(3)	(4)	(5)
	writing of Text Books in Geography for Higher Secondary classes (IX, X, XI) and Evaluation of some Geography Text Books prescribed by the U.P. Board of Higher Secondary Education.	1956	C.I.E., D.	M.Ed.
218.	A brief analysis of some History Text .Books prescribed by the Gauhati University for classes IX, X, XI of the High Schools of Assam in the light of the commonly accepted aims and objectives of History teaching in schools.	1956	C.I.E., D.	M.Ed.
219.	The trends in nationalization of School text-books.	1958	V.B., U.	M.Ed.
220.	A critical study of Social Studies Text-Books for classes VI, VII and VIII.	1956	V.B., U.	M.Ed.
221.	A study of children's literature in Hindi.	1954	V.B., U.	M.Ed.
222.	Hindi books for non-Hindi speaking areas.	1959	C.E., O.U.	M.Ed.
223.	A survey of Science text books at Secondary stage in Marathi Medium.	1957	C.E., O.U.	M.Ed.
224.	English text-books for the lower higher secondary schools in India.	1956	E.C., O.U.	M.Ed.
225.	A critical study of Text-books based upon the revised syllabus in English for Secondary Schools of Madras..	1956	M.T.C., M.U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
226.	An evaluation of text-books available in Composite Mathematics for Higher Forms in Madras.	1959	M.T.C., M.U.	M.Ed.
Field—Skills				
227.	The reproductive vocabulary in English at the Middle School level.	1952	P.S.M., J.	M.Ed.
228.	A study in children's vocabulary with reference to children of 7.	1959	V.B., U.	M.Ed.
229.	Reading tests and diagnosis of reading difficulties.	1957	V.B., U.	M.Ed.
230.	Common errors committed by non-Hindi speaking students in Hindi language and resources for remedy.	1957	C.E., O.U.	M.Ed.
231.	Difficulties of pronunciation of South Indian Children learning to speak English.	1960	M.T.C., M.U.	M.Ed.
232.	An investigation into the causes of spelling mistakes in English of some middle school pupils with remedial suggestions.	1960	M.T.C., M.U.	M.Ed.
233.	Spelling errors in English.	1960	R.T.C., C.	M.Ed.
234.	A study of student writing in Delhi Schools.	1960	C.I.E., D.	M.Ed.
Field—Philosophy of Education				
235.	Critical analysis of the suitability of Montessori system of Education to Indian conditions.	1956	E.D., A.U.	M.Ed.
236.	Educational thoughts of Rabindra Nath Tagore.	1958	V.B., U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
237.	The Gurukula System of education and its use in modern times.	—	B.H.U.	Ph.D.
238.	An examination of the educational ideas of Mahatma Gandhi in the light of ancient Indian educational ideas.	—	U.K., T.	M.Ed.
239.	Realism in Education.	1959	C.E., O.U.	M.Ed.
240.	Basic Education in the light of Montessori principles.	1960	V.B., U.	M.Ed.
241.	Philosophic evaluation of Nai Talim.	1954	C.E., O.U.	M.Ed.
	Field—Aids and Equipment			
242.	A study of the provisions prevailing and the effective use made of School Broadcasts in High and Higher Secondary Schools of Delhi.	1958	C.I.E., D.	M.Ed.
243.	A survey of secondary school libraries in Srinagar City.	1958	C.I.E., D.	M.Ed.
244.	Use of audio-visual aids in the teaching of social studies.	1958	R.T.C., C.	M.Ed.
245.	The efficacy of audio-visual aids in the teaching of Natural Science.	1960	M.T.C., M.U.	M.Ed.
246.	An experimental investigation to determine the use of visual aids in the teaching of Biology with IX and X class girls at Agra.	1957	W.T.C., A.	M.Ed.
247.	The role of aids and audio-visual aids in Geography teaching.	1959	C.E., O.U.	M.Ed.

(1)	(2)	(3)	(4)	(5)
248.	An investigation into the use and effects of audio-visual aids in the teaching of General Science in the High School classes.	1959	C.E., O.U.	M.Ed.
	Field—Syllabus			
249.	A comparative study of the syllabus in social Studies for the Middle Schools in some selected states in India.	1956	C.I.E., D.	M.Ed.
250.	A Critical study of the syllabus in English prescribed by the Delhi Board of Higher Secondary Education for Examination in 1962.	1960	C.I.E., D.	M.Ed.
251.	Construction of a new syllabus for the teaching of Social Studies in High Schools of Madhya Pradesh.	1957	P.S.M., J.	M.Ed.
252.	A new detailed syllabus for Primary Schools in Madhya Pradesh.	1953	P.S.M., J.	M.Ed.
253.	Geography syllabus in our schools.	1957	C.E., O.U.	M.Ed.
	Field—Moral Education			
254.	Character training in our Secondary Schools.	1950	P.S.M., J.	M.Ed.
255.	Moral instruction in Secular and Denominational schools of Agra District.	1960	W.T.C., A.	M.Ed.
	Field—Comparative Education			
256.	A comparative study of adult education in India and Philippines.	1957	C.I.E., D.	M.Ed.

(1)	(2)	(3)	(4)	(5)
257.	A comparative study of the development of Rural Higher Education in India, U.K., U.S.A. and U.S.S.R.	1960	V.B., U.	M.Ed.
	Miscellaneous			
258.	Rural reconstruction through Basic Education.	1957	C.E., O.U.	M.Ed.
259.	Leisure time activities of men teachers of Allahabad University.	1958	E.D., A.U.	M.Ed.
260.	School and extra-curricular activities.	1959	C.E., O.U.	M.Ed.
261.	The leisure time activities of the High School students in Udaipur.	1954	V.B., U.	M.Ed.
262.	A critical inquiry into the teaching of Science (Physics, Chemistry, Physiology and Hygiene) in High Schools in Madhya Pradesh.	1955	P.S.M., J.	M.Ed.
263.	The teaching of General Science Schools at Elementary stage.	1959	C.E., O.U.	M.Ed.
264.	An investigation into the teaching of Sanskrit in High Schools of Madhya Pradesh	1954	P.S.M., J.	M.Ed,
265.	Teaching of Poetry in High School classes.	1958	C.E., O.U.	M.Ed.
266.	Teaching of Home Science in Secondary Schools	1959	C.E., O.U.	M Ed.
267.	Hindi Short stories.	1955	E.D., A.U.	M.Ed.
268.	An investigation into the teaching of Geography in High Schools of M.P.	1954	P.S.M., J.	M.Ed.

(1)	(2)	(3)	(4)	(5)
269.	An investigation into the teaching of English in High Schools of M.P.	1953	P S.M., J.	M.Ed.
270.	Causes of fall in the standard of English (VI-X class).	1957	E D., A.U.	M.Ed.
271.	An investigation into the teaching of Mathematics in High Schools of M.P.	1956	P S.M., J.	M.Ed.
272.	Attitudes of illiterate women towards social education.	1951	P.S.M., J.	M.A.
273.	An objective study of the results of social education.	1953	P.S M., J.	M.Ed.
274.	A critical analysis of the Social Education Scheme.	1950	P.S.M., J.	M.Ed.
275.	Social education and Welfare States.	1957	C.E., O.U.	M.Ed.
276.	Technical education in Assam.	1958	E.D., A.U.	M.Ed.
277.	Academic appraisal of the Kerala Education Act, 1959.	1960	C.I E., D.	M.Ed.
278.	Educational backwardness of women in Udaipur Division.	1953	V.B., U.	M.Ed.
279.	Some problems of Women's Education.	1950	P.S.M., J.	M.Ed.
280.	Study of different Kindergarten Schools in Hyderabad city.	1957	C.E., O.U.	M.Ed.
281.	A study of the working and results of compulsory elementary education in the city of Madras.	1956	M.T.C., M.U.	M.Ed.
282.	A survey of Primary Education in Seoni.	1954	P.S M., J.	M.Ed.
283.	A study of compulsory education in Travancore-Cochin.	—	U.K., T.	M.Ed.

(1)	(2)	(3)	(4)	(5)
284.	Improving the community through the school.	1952	V.B., U.	M.Ed.
285.	The educational problems of refugees in Rajasthan.	1954	V.B., U.	M.Ed.
286.	Education of Bhil children in Vidya Bhawan.	1958	V.B., U.	M.Ed.

APPENDIX E

A List of Some Problems Studied and Reported in Various Publications During 1950-60 in Various Fields of Education in India*

S. No. (1)	Topic (2)	Author (3)	Publication (4)
	Field—Psychology of Education		
1.	A Study of Muscular and Mental fatigue from Craft work in Basic Education.	S.V. Sharma	I.J. of E.R., IV, 1.
2.	Effect of interpolated learning upon recognition.	A.K.P. Sinha & S.K. Rey	J. of Ed. & Psy., XVI, 4.
3.	A Study of Intelligence Scores with and without time-limit.	M.C. Joshi	J. of Ed. & Psy., Apr. '56
4.	An analysis of the attitude of school children towards certain school subjects and the measure of correlation between attitude and adjustment.	M.D. Swan	I.J. of E.R., II, 2.

*In the above Table —

I.J. of E.R. stands for *Indian Journal of Educational Research ;*
J. of Ed. & Psy. stands for *Journal of Education and Psychology ;*
C.I.E.S. in Ed. & Psy. stands for *C.I.E. Studies in Education and Psychology ;*
P. of Ed. stands for *Progress of Education ;*
Sh. for *Shiksha ;*
R. & S, E.D. A.U. for *Researches and Studies,* Education Department, Allahabad University.
B. Ed. J. for *British Educational Journal ;*
Tg. for *Teaching.*

(1)	(2)	(3)	(4)
5.	Attitudes of University students towards some socio-cultural and educational issues.	Dr. R. Rath	J. of Ed. & Psy., XIV, 4
6.	Attitude towards punishment.	Usha Sheorey	I.J. of Ed. R., IV, 1.
7.	The Mentally retarded child.	U. Shankar	C.I.E.S. in Ed. & Psy., 21.
8.	Frustration as a determinant of Level of Inspiration.	S.L. Sinha	J. of Ed. & Psy., Ap. 54.
9.	An experimental study of the trends of personality development as revealed in the senior Pupils of academic and technical schools.	H.S. Mishra	I.J. of Ed. R., II, 2.
10.	Some preliminary data about the adaptation of Rosenzeweig P-F Study (Children's Form)	U. Pareek	Ed. & Psy., V, 2.
11.	Adolescent Ambitions.	J.C. Pande	I.J. of Ed. R., IV, 1,
12.	Measurement of Teaching Personality.	K.N. Raina	I.J. of Ed. R., IV, 1.
13.	Cause of General and Specific backwardness (in Arithmetic) in Secondary School pupils.	D.K. Ahluwalia	I.J. of Ed. R., IV, 1.
14.	Friendship between Language groups in Delhi multilingual schools.	K.P. Chowdhary	I.J. of Ed. R., III, 4.
15.	A study of a test of Reasoning ability.	K.N. Sharma	J. of Ed. & Psy., Vol. XVII-XVIII; 4, 1.

(1)	(2)	(3)	(4)
16.	The psychology of the handicapped child in relation to his family.	W.D. Wall	J. of Ed. & Psy. XIV, 1.
17.	Education of the Mentally Defective.	N.C. Chatterji	I.J. of Ed.R., III, 1.
18.	Leadership among children.	P. Pasricha	C.I.E.S. in Ed. & Psy., 13.
19.	A study of Child Delinquency.	U. Shankar	C.I.E.S. in Ed. & psy., 5.
20.	The attitude of Basic School children towards school activities.	E.A. Pires	C.I.E.S. in Ed. & Psy., 17.
	Field—Educational Measurement		
21.	Factor analysis study of Examination marks.	S.C. Dash	J. of Ed. & Psy., XIII, 2.
22.	Construction and standdardization of a predictive battery of differential scholastic aptitude.	A.N. Verma & Staff	Min. of Edn. Govt. of India, Publication of the same title.
23.	A Factor analysis of Examination Marks.	S.K. Mitra	J. of Ed. & Psy., XVI, 3.
24.	A Multifactor Test Battery.	S.R. Mitra	Edn. & Psy., V., 3.
25.	Item-analysis of Group Intelligence test on Higher Group.	S. Deb	Edn. & Psy., V., 2.
26.	On Item Difficulties of a scholastic achievement test.	P.B. Nanda & S.D. Dubey	J. of Ed. & Psy., XVI, 3.
27.	Scaling or standardization of teachers' marks.	K. Chaudhery	J. of Ed. & Psy., XV, 1.
28.	Test-retest variations in answers to Personal Data Form.	D. Sinha	Ed. & Psy., V, 3.

(1)	(2)	(3)	(4)
29.	Attainments of children in Basic and Non-Basic schools.	V.V. Kamat	I.J. of Ed. R., III, 2.
30.	A Factorial Analysis of Moray House Tests.	P.K. Roy	I.J. of Ed.R., III, 2.
31.	A study of marks obtained by examinees, in different subjects at the Examination of the University of Delhi in the years 1950-1957.	S.L. Shukla	C.I.E.S. in Ed. & Psy., 33.
32.	A comparison of the attainment of children of the C.I.E. Basic School with those of the other school children in Delhi.	S.L. Shukla & D.N. Tuttoo	C.I.E.S. in Ed. & Psy., 36.
Field—Educational Administration and Organisation			
33.	An educational experiment in discipline.	R. Rao	P. of Ed., XXIX, 2.
34.	An investigation into the duties, qualifications and qualities of the Head of a Secondary School.	T.R. Sharma	Ed. & Psy., V, 2.
35.	The problem of attendance in Primary Schools.	S. Natranjan	I.J. of Ed. R., II, 1.
36.	The problem of freedom and discipline in the Gurukula, Visva Bharti, Jamia Millia and Wardha system of education.	C.M. Thacore	I.J. of Ed. R., III, 2.
37.	When pupils teach themselves.	J.C. Patel	P. of Ed., XXXIII, 12.
Field—Teacher Education			
38.	An experiment in the selection of student-teachers.	E.A. Pires	Sh., V, 1.

(1)	(2)	(3)	(4)
39.	Attitude of student-teachers towards children's behaviour.	E.A. Pires	C.I.E.S. in Ed. & Psy., 1.
40.	Investigation into the education of Basic Teachers.	S. Saraf	I.J. of Ed. R., III, 4.
41.	A suggested course of study for the undergraduates in Teacher-Training — Introduction Teaching.	Paul Unger	Ed. & Psy., V, 3.
42.	An investigation into the Practical Training of Secondary Teachers in India.	E.A. Pires	I.J. of Ed. R., IV. 1.
43.	An investigation into the validity of battery of selection tests used for admission to a Bachelor of Education Degree Course.	R.N. Mehrotra	C.I.E.S. in Ed. & Psy., 29.
Field—Educational and Vocational Guidance			
44.	Vocational interests of men and women.	D.N. Sinha & U. Niwas	Ed. & Psy., V, 1.
45.	Children employed in gainful occupations in the city of Jabalpur.	S.K. Verma	I.J. of Ed. R., IV, 1.
46.	Measuring personality patterns for Engineering and Medicine.	Dr. S.P. Ghoah	J. of Ed. & Psy., Ap' 56.
Field—Child Development			
47.	Distribution of Height and Weight among different age-groups of school children.	I. Devi	Ed. & Psy., V, 1.
48.	Heights and weights of Indians.	V.V. Kamat	I.J. of Ed. R., II, 2.

(1)	(2)	(3)	(4)
49.	The relationship of intelligence to emotional social and aesthetic development of children.	M. Yoganarasimhia	J. of Ed. & Psy., XVI, 2.
50.	An exploratory study of the development of the concept of quantity, discrimination of continuous and discontinuous quantities.	C.L. Shedd	Ed. & Psy., V, 3.
Field—Curriculum			
51.	Building up a Social Studies curriculum for the C.I.E. Basic School.	E.A. Pires & K. Katyal	C.I.E.S. in Ed., & Psy., 18.
52.	The curriculum in Geometry and intelligence level of students.	V.R. Gokhale	I.J. of Ed. R., III, 1.
53.	Developments in curriculum of Indian Muhammadan Institutions.	H.N. Pairmov	R. &. S. Ed. A.U. 8.
54.	On the determination of weights for different branches of High School Mathematics.	A.K. Gayen	J. of Ed. & Psy., XIV, 4.
Field : Socio-Economic Background.			
55.	The socio-economic background of Bright children.	S.L. Shukla & D.N. Tuttoo	(C.I.E. Psy. Wing).
56.	Sociological variables and intelligence of the school going population.	R.N. Varma	Ed. & Psy., V, 3.
57.	A critical study of social and economic conditions of women primary teachers in Bombay city and suburbs.	S. Mankekar	I.J. of Ed. R, II, 1.

(1)	(2)	(3)	(4)
Field : Methods of Teaching			
58.	Evolving an effective plan of home-assignments and their correction.	S.N. Singh	B. Ed. J., VIII, 7 & 8.
59.	The teaching of second languages.	A. De. Souza	Tg., XXXII, 3.
60.	An experiment in Social Studies in Standards V, VI & VII.	S.T. Zachariah	Tg., XXXII, 3.
61.	Experimental work in Sanskrit Dictation.	P.K. Dongre & T.P. Lele	J. of Ed. & Psy., XIII, 1.
Field : History of Education			
62.	Education as revealed in the Upanishads.	S.P. Srivastava	R. & S. Ed., A.U., 8.
63.	A review of Education in Saurashtra (1948-1951).	J.P. Naik	I.J. of Ed. R., III, 2.
Field—Text Books			
64.	A study in the vocabulary of Hindi Primers.	A.N. Basu, M.K. Malhotra, & B. Bahadur.	C.I.E.S. in Ed. & Psy., 10.
65.	An analysis of the idea content of the text-books in Hindi of classes IX-XI of Delhi (1947-1957).	S.L. Shukla & B.V. Mohale.	(C.I.E., Psy Wing.)
Field—Skills			
66.	A study of the speed of writing of children (11-14).	M.B. Buch & T.P. Lele.	J. of Ed. & Psy., XIII, 2.
67.	A study of the written vocabulary of sixth class children in Delhi Schools.	P. Pasricha	C.I.E.S., in Ed. & Psy., 36.

(1)	(2)	(3)	(4)
	Field—Philosophy of Education		
68.	Educational implications of Radhakrishnan's Philosophy.	P. Kumari	I.J. of Ed. R., II, 1.
69.	Social and Individual aims in the Gurukula, Vishva Bharti, Jamia Millia, and the Wardha Systems of Education.	C.M. Thacore	I.J. of Ed. R., III, 1, 2.
	Field—Moral Education		
70.	The sympathetic approach in moral education.	F. Baumgarten.	Ed. & Psy., V, 2.
71.	Teaching children good citizenship.	P. Nagarwalla.	Tg., XXXII, 8.
72.	Religion in public education in India.	S.S. Raichur	I.J. of Ed. R., III, 1.
	Field—Syllabus		
73.	A Detailed Syllabus in English for the Senior High School.	Director, Govt. C.P.I., Allahabad.	Sh, Vol. VIII, No. 1.
	Miscellaneous		
74.	An experiment in preparing a Basic vocabulary for adults.	A.N. Basu & L.N. Sharma	C.I.E.S. in Ed. & Psy., II.
75.	A critical study of the social education scheme in Madhya Pradesh.	D.G. Kasture	I.J. of Ed. R, III, 1.
76.	Sleep and leisure time activities of high school students.	R. Krishna	I.J. of Ed. R., IV, 1.
77.	A study of the recreational activities of the college students of Jabalpur.	S.N. Randive	I.J. of Ed. R., IV, 1.

(1)	(2)	(3)	(4)
78.	Liquidation of illiteracy in the state of Bombay.	B. Gokhale	I.J. of Ed. R., II, 1.
79.	Two experiments in education.	F.G. Pearce	Tg., XXXII, 3.
80.	Children that do not attend a school.	R.V. Parulekar	I.J. of Ed. R., II, 1,

APPENDIX F

A List of Problems Suggested for Research in India*

I. Educational and Developmental Psychology

1. A study of Reading interests of children at different levels.
2. A study of the development of Mathematical and Verbal concepts in children.
3. Studies of Play of Children of Various age groups.
4. Study of intellectual, social, physical and emotional development of the gifted.
5. Study and measurement of the interests of pupils at different levels against different social backgrounds.
6. Study of psychological factors involved in the problem of discipline.
7. Study of problem children.
8. Study of the extent and causes of mental retardation of pupils in Primary and Secondary schools.
9. Study of physical, intellectual and social development of children at different stages, such as infancy, childhood and adolescence.
10. Problems of emotional mal-adjustment of adolescent pupils.
11. Problems of social adjustment in Co-educational Institutions.
12. Delinquency in India—study of its extent and causes.
13. Attitude of students at different levels towards various occupations and its measurement.
14. Personality patterns of children from different socio-economic strata.
15. Attitude of secondary and college students to cinema.
16. Mental development of children of working parents.

*Suggested and classified by the Working Group, for Sixth Conference of the All India Association of Training Colleges, held at Bangalore in June, 1961.

17. Causes of Backwardness in School Subjects.
18. A study of the attitude of parents towards Co-education in different culture groups.
19. Discipline and Teacher Pupil relationship.
20. Students' attitude towards different cultures and religions as related to school harmony.
21. Different types of Intelligence (social, practical, and abstract) and their bearing on academic purposes.
22. Development of interests, attitudes and certain personality traits through hobby centres and co-curricular activities in schools.
23. Diagnostic tests in different School Subjects.
24. Relation between social intelligence and academic achievement.
25. A study of the school curriculum at various stages vis-a-vis interests.
26. An investigation into the Study Habits of primary and secondary school pupils, and their bearing on school achievement.

Further Areas Suggested

1. Problems related to motivation and learning.
2. Personality study of graduates and under graduates against different socio-economic backgrounds.

II. Indian Philosophy

1. New Experiments of education in India—their estimate in the light of Indian culture and philosophy.
2. How far the philosophy of Basic Education has been put into practice in a typical Basic School.
3. The integration of the ancient Indian and the Western theory and practice of education.
4. Pragmatic trends in contemporary Indian Education.
5. To study the extent to which Ancient Hindu philosophy and psychology can help education to-day.
6. A study of different Philosophies of Education (Indian and Western) with a view to develop a sound Philosophy of Education suitable to the present Indian conditions.
7. Study of the social and economic factors impeding craft

education at secondary stage in various parts of the country.

8. To study the impact of education for democracy on the school practices.,

III. Educational Administration

Single Unit Research Problems

1. A study of the demand made on the time of Principals of Higher Secondary Schools in a particular locality.
2. To develop criteria for effective school inspection.
3. A study of special problems of the single teacher school.
4. A study of the effect of panel inspection on the working of the schools.
5. A survey of facilities of libraries, laboratories etc. in secondary schools in a particular area.
6. A study of the effectiveness of school inspection on the working of the schools.
7. Survey of experiments on Democratic education in a specified area.
8. A study of the attitude of teachers towards democratic self-government.
9. To investigate the causes of indifference of the teachers towards their work,
10. Comparative study of Teacher Training Programmes in different States in India at a particular level.
11. A comparative study of the Educational Administrative patterns in the various states of India.
12. A survey of the actual working time in a school in one year in a particular locality.
13. To develop a profile of (a) a good Head of an institution (b) a good Supervisor.
14. A comparative study of salary scales and other service conditions of Higher Secondary teachers in different states of India.
15. A study of the existing Basic School buildings in a particular area with a view to the suitability for efficient work.
16. To study the problems of converting traditional schools into Basic Schools in different areas.

17. Problem of student indiscipline as related to social factors prevailing in a particular area.
18. To investigate how far Multipurpose Schools have resulted in helping pupils of lesser academic ability.
19. To study the effects of decentralization of administrative powers at the district level.
20. Relation of socio-economic background and the achievements of students at the H.S. Stage.
21. To study the problems of Teacher Training Colleges in regard to practising schools.
22. To evaluate the effect of inservice Teacher Training Programme in the country.
23. To study the effect of different methods of arranging teaching practice lessons on the work of the student-teachers.
24. To study the effect of the supervision work done by the lecuturers on the teaching practice of students.

Problems for Co-ordinated Research

1. A survey and evaluation of the administration of school systems in different states of India.
2. To study the working of co-educational institutions in different states of India.
3. To investigate into the nature and extent of pupils' participation in school administration in different areas of the country.
4. To study the budgeting and financial procedures at Central, State and Local levels.

Long-Range Problems

1. Impact of enhanced scales of pay on efficiency in the work of teachers.
2. Effect of decentralization of educational administration at district levels.
3. Curriculum development by experimental methods.
4. To find out the impact of co-curricular activities on personality development of the pupils.

Further Problem Areas

1. Human relationship in administration.
2. Problem of emotional integration in schools.

IV. Educational Evaluation and Measurement

1. A study of techniques of oral examination as an integral part of examination system.
2. Evaluation of an integrated pattern of secondary education for the realization of the objectives of secondary education.
3. Framing of valid tests for selection of graduates for training colleges.
4. Comparative study of different procedures of factor analysis.
5. Development of evaluation techniques for crafts.
6. Comparison of students in multi-purpose and non-multi-purpose schools with special reference to Social attitudes.
7. A follow-up study of students passing the S.S.C. Examination particularly in the context of secondary courses pursued by them.
8. Study of the effect of Introduction of Evaluation techniques on students' learning.
9. How to make the internal assessment at different colleges comparable to one another.
10. How to secure uniformity in Std. of practical examination in different colleges.
11. Identification of personality traits conductive to good teaching at school.
12. Development of evaluation techniques for adult schools.
13. Construction of a battery of aptitude tests for high school students.
14. Effect of staggering the examination on the ultimate achievement of pupils.
15. A comparative study of the distribution of scores in different subject, at the secondary school leaving examination.
16. An investigation into the social and moral growth of the school N.C.C. cadets.
17. Critical inquiry into the systems of internal assessment in secondary schools of a particular region.

Further Areas Suggested

1. A study into the standards at secondary and college level (Whether going down).
2. Follow-up study of trained teachers.

Development of Tools

1. Construction and standardisation of different tests of psychological factors and abilities at different levels.
2. Preparation of diagnostic tests in different school subjects.
3. Standardisation of non-verbal group intelligence tests on regional basis.
4. A development of achievement tests in different subjects for differents grades.
5. Construction and standardisation of Tests on intelligence, attitudes, aptitude and personality traits of children in rural and urban areas.
6. Construction of interest inventories and personality inventories in Indian languages.

V. Education and Vocational Guidance

1. Analysis of the requirements for the diversified courses.
2. A survey of vocational guidance services as developing in India and their problems.
3. A survey of the vocational needs and job-potentiality of a locality.
4. To assess vocational maturity at the end of the Higher Secondary stage.
5. Validity studies of various kinds of tools used for guidance.
6. Job-analysis of careers suited for women.
7. Survey of facilities for educational and vocational training for physically handicapped Indian children.
8. Vocational choice-making tendency among secondary school children.
9. An investigation into the causes of wastage and stagnation at primary and secondary levels.
10. Studying the effect of keeping cumulative records for students on guidance programme.
11. Vocational interest of secondary school pupils in relation to their scholastic achievement.
12. Adaptation of foreign tests for vocational use.

Area

VI. Methodology of Teaching Different School Subjects

1. A study of correlation in the teaching of (1) English and

the mother tongue (2) Hindi and mother tongue with regard to reading, grammar, composition and speech.

2. To devise means and methods to promote self-study or self-learning in pupils.
3. Comparison of sound systems in English and Hindi or English and any regional language with a view to ascertain the difficulties in pronounciation to suggest remedies.
4. Individualising instruction and devising special preferences for gifted children in different school subjects.
5. To study the effect of the structural method for language studies.
6. Development of learning experiences for the attainment of selected objectives of the teaching of different subjects.
7. Study the possibilities of increase in the content of syllabi with the introduction of the mother tongue as medium of instruction.
8. To try-out different sets of science club activities with a view to developing basic skills, and understandings necessary for a successful science club member.
9. To study the potentially of activity methods in the teaching of school subjects.
10. To evolve a practical and practicable syllabus for physical education for girls.
11. To prepare a list of topics suitable for dramatisation in the teacding of history.
12. To determine suitable reading material for various grades in different subjects.
13. Factorial analysis of abilities involved in different branches of the same subject.
14. An investigation into the reading interests of boys and girls with a view to assessing their needs.
15. To develop a Home Science course suitable to Indian conditions.
16. Assessing the strain on secondary school children as a result of a compulsory study of our languages.
17. Grading concepts in Mathematics and Science by age levels.
18. A comparative study of different methods adopted in teacher training at different institutions.

19. Evolving methods directed towards development of social skills.
20. Methods of teaching the secondary school subjects.
21. To develop techniques of teaching English according to structural approach and to produce teachers' Hand-books for adopting effective methods of teaching the subject.
22. To study the following aspects in respect of reading at different grade levels in secondary schools:
    (1) Speed (2) Comprehension (3) Span of reading (4) Frequency of error in loud reading (5) Extensive and intensive reading (6) Interest in reading different types of literature.

VII. Miscellaneous Problems Including Syllabus, Text-Books and Teacher Training

1. A comparative study of syllabi in different major subjects in different states or countries.
2. To investigate the situations that make the newly trained teacher lose his interest and enthusiasm in new methods and experimentation and propose remedies to keep his interest sustained.
3. To study the dynamics of leadership in secondary schools.
4. A critical study of the structure of school buildings obtaining in any state of India.
5. A study of family structure, child rearing practices, attitudes and values in various communities or various economic groups in relation to school achievement.
6. Development of the course content and text-books based on them in social studies for
    (*a*) Primary Schools
    (*b*) Middle Schools
    (*c*) High and Higher Secondary Schools.
7. Development of the course content and text-books based on them in General science for
    (*a*) Primary Schools
    (*b*) Middle Schools
    (*c*) High and Higher Secondary Schools

A List of Some Psychological Tests*

Author	*Title*
Alexander:	Passalong Test, with Manual
Allport:	A.S. Reaction Study in Personality, Men & Women
Allport:	Study of Values
Ammons:	Full Range Picture Vocabulary Test
,,	Vocational Apperception Test
Andrew:	Minnesota Clerical Test
Arthur Grace:	Stencil Design Test Form I & II
Bass:	Famous Sayings Test
Bellak:	T A T Blanks
Bender:	Bender Visual Motor Gestalt Test
Bennett:	Mechanical Comprehension Tests Form: AA, BB, CC and WI
Bhatia:	Performance Tests for Indian Children
	Differential Aptitude Tests
	Abstract Reasoning
	Space Relations
	Numerical Ability
	Mechanical Reasoning
	Language Usage
	Verbal Reasoning
	Individual Report Blanks (Profile Charts)
	Also Indian Modified booklets
	Minnesota Paper Form Broad (AA, BB series)
Bennett:	Stenographic Aptitude Test
Bennett:	Guidance Summary Form
Bordie:	Minnesota Counselling Inventory
Blum:	Blacky Pictures
Brainard:	Occupational Preference Inventory

*Available at Mansayan, 32, Faiz Bazar, Delhi-6.

Author	*Title*
Brown:	Rawing Scale for Personality Qualities
Brown:	Chicago Non-Verbal Examination
Cook:	Minnesota Teacher Attitude Inventory
Curoton:	Multi Aptitude Test
Curoton:	C.D. Hand Correlation Chart
Darley:	Minnesota Personality Scale Form M & W
Grune & Stratton:	Location Charts showing Beck's Scoring Area
Dombreso:	Id. Ego Super Ego (IES) Test
Edwards:	Edwards Personal Preference Schedule
Eisonson:	Examining for Aphasia
Foar:	Employee Evaluation Manual and Form for Interviewers
File:	How Supervise: A, B, M.
Flanagan:	Flanagan Aptitude Classification Test
	Vocational Aptitude Survey
Goist:	Goist Picture Interest Inventory T/Kit
G.C. Staff:	General Clerical Test
Gordon:	Personal Profile and Inventory
Hathaway:	Minnesota Multiphasic Personality Inventory
Henmon Nelson:	Tests of Mental Ability
Jackson:	A Test of Family Attitude
Jalota:	Group Int. Test in Hindi (or in Punjabi)
Kellog:	Revised Bota Examination
Kohs:	Block Design Test
Lennepp:	Four Picture Test
Lindquist:	Gowa Test of Basic Skills
Large & Thorndike:	Intelligence Tests
Moier:	Art Tests Part I Art Judgement
Miles:	A B C Vision Test (For determining ocular dominance)
Mooney:	Problem Check List (Forms J, H, C & A)
Moore:	Engineering & Physical Science Aptitude Test
Murray:	Thematic Apperception Test
O'Rourke:	Mechanical Aptitude Tests

Author	*Title*
Pareek, U:	Indian Adaptation of Rosenzweig Picture Frustration Study for Children
Phillipson:	The objective Relations Technique
Porteus:	Porteus Maze Tests
	Post Calculine Charts
	1. Multiplication
	2. Division
	3. Square Root
	4. Cube Root and
	5. Logarthim
Raven:	Standard Progressive Matrices
	Coloured Progressive Matrices for children
Rorschach Projective Technique:	
	Psychodiagnontic Plates
	Test Psychodiagnostics
	Location Charts,
	Showing Beck's scoring area
Rorschach Evalographs:	
	Buhler Lefever Sign Record List for determining. Basic Rorschach Score
Rotter:	Incomplete Sentence Blank (High School, College, or Adult)
Sargent:	Insight Test
Sleight:	Nonverbal Intelligence Test
Symonds:	Picture Story Tests
	Test—Adolescent Fantsy
Terman:	Concept Mastery Test
Terman McCall:	Non Language Multimental Test
SRA:	Michigan Picture Tests
SRA:	Educational Test
SRA:	Tests of General Ability
Therpe:	Achievement Series
Thurstone:	Tests of Educational Ability
"	Thurstone Interest Schedule
Watson:	Watson Glazer Critical Thinking Appraisal
Weschler:	Weschler Memory Scale Form I & II

Author	*Title*
Weider:	Cornnel Index
Wells:	Mental Examiners Handbook
Wells:	Revision and Modification of Army Alpha Examination
Wesman:	Personnel Classification Test
Wittenborn:	Psychoatric Rating Scales

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